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MEDICINE & HISTORY

Series V Volume III № 1 March 1981

Published Since 1793

Fielding H. Garrison: The Man and His Book

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SAMUEL X RADBILL LECTURE

IT must say something about our field, the history of medicine, that its standard reference work is a book that is now more than half a century old. Thus Fielding H. Garrison's bibliographic endeavors have kept his name predominant for almost seven decades. His most important book, *An Introduction to the History of Medicine,* was first published in 1913. Further editions appeared in 1917 and 1921; the fourth edition, still in print, first came off the presses in 1929, 51 years ago. As Henry Viets has pointed out, no one before his time had stimulated so widespread an interest in the history of medicine in this country. "In the minds of American physicians from 1913 on, Garrison and medical history became synonymous..."[1]

I

Fielding Garrison was born in Washington, D.C. on the fifth of November, 1870, the older of two children. His father, a middle-level government employee, was from a Virginia family of Scottish descent. His mother's ancestors fought in the Revolution, but it was from her that he believed he had inherited a "French mind which sees things as they are and believes nothing it does not factually know."[2] Virtually no information remains about Garrison's childhood except that he grew up in a family that valued education. He studied music, which was to become a lifelong interest and a solace from the literary tedium of his later life. His father urged him to study German instead of Latin at

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1. Henry R. Viets, "Fielding H. Garrison and His Influence on American Medicine," *Bulletin History of Medicine* 5(1937): 347-52; 347. For a more recent appraisal see Erwin H. Ackerknecht, "Zum hundertsten Geburtstag von Fielding H. Garrison," *Gesnerus* 27(1970): 229-30.

2. F. L. Tietsch, "Self-portrait of Fielding H. Garrison, Autobiographic Excerpts Compiled from His Letters," *Bulletin History of Medicine* 7(1939): 365-73; 366. For further biographical information see Solomon R. Kagan, *Life and Letters of Fielding H. Garrison* (Boston: Medico-Historical Press, 1938), and *Fielding H. Garrison, A Biography* (Boston: Medico-Historical Press, 1948). I shall refer to these as Kagan, 1938, and Kagan, 1948. Both editions contain many Garrison letters and a bibliography of his writings. Unfortunately, the books also contain many misspellings, some factual errors, and were not very well received. There has as yet been no full biography of Garrison, a very rich subject for anyone inclined to such a study. The present article and some additional material will be part of a long introduction to a fifth edition of the *History* that I am preparing. I do not plan to pursue the biographical aspect of Garrison much further, however.

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Washington High School, but he made up the deficiency in classical languages without difficulty in later years.

After a year spent at home following graduation from Washington's Central High School, Garrison enrolled at the Johns Hopkins University in the fall of 1887, and received his bachelor's degree three years later. Study at Hopkins in those days was organized in groups of subjects; Garrison chose mostly languages, ancient and modern, as well as some physics and mathematics. Hopkins, only eleven years in existence when Garrison began, had relatively low tuition fees, and room and board were cheaper than those in schools farther north. The students were treated like mature adults. "It was assumed that a student who attended the University was serious enough to be left in his own devices..." recalled Abraham Flexner, who had preceded Garrison in Baltimore by a few years.[3]

I have found little indication that Garrison intended to study medicine and no evidence as to why he enrolled in the Medical Department of Georgetown University. Because in those days—the autumn of 1890—medicine could be studied in the hours after government offices closed, and quite probably because of his family's financial needs, Garrison followed his father and many other Washingtonians into government service. His experience at medical school doubtless led him to accept probationary appointment, beginning in March 1891, as a clerk at the Surgeon General's Library at $700 per year. Here he quickly came under the influence of the awesome John Shaw Billings, long-time director of the Library. Garrison completed his medical studies in 1893, receiving the M.D. degree. He never practiced medicine but chose instead to remain at the Army Library for nearly forty years. In 1930 he accepted the directorship of the newly established Welch Medical Library at Johns Hopkins, where he worked and participated in the teaching at the Institute of the History of Medicine in its early days. On April 18, 1935, a few days after a surgical operation, Garrison died of cancer of the colon.[4]

The Surgeon General's Library provided information for military surgeons and for patrons living outside the Washington area. The staff divided the work. To Garrison fell responsibility for medical research, general questions, psychology,

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3. Abraham Flexner, *An Autobiography* (New York: Simon and Schuster, 1960), p. 33. Flexner was a student at Hopkins in 1884-1886. See also Hugh Hawkins, *Pioneer: A History of the Johns Hopkins University, 1874-1889* (Ithaca: Cornell University Press, 1960); and Kagan, 1948.

4. Edgar Erskine Hume, "Garrison and the Army Medical Library, 1891-1930," *Bulletin History of Medicine* 5(1937): 301-45. This entire issue of the *Bulletin* was the Fielding Garrison Memorial Number. Dr. Wyndham H. Miles of the National Library of Medicine has very kindly allowed me to read four of the chapters from his manuscript of a history of the Library, which contain much additional information about the environment in which Garrison toiled for forty years. A brief medical note about his final illness may be seen in a letter by Dean Lewis, who operated on him three days prior to his death, to Garrison's long time friend and correspondent Harvey Cushing, 15 April 1935, in Garrison-Cushing letters, Yale Medical Library, Historical Collections.

history, and bibliography. With Billings, and later with the elderly Dr. Robert Fletcher, Garrison worked on both the *Index Catalogue* and the *Index Medicus*. John Shaw Billings believed that the librarian is in one respect

> a sort of hod-carrier who brings together the bricks made by one set of men in order that another set may build therewith—he is apt to take quite as much pride and satisfaction in the resulting structure, provided it be a good one, as if he had built it himself;...[5]

Garrison's approach to his own historical work is also evident in this sentiment.

There is little doubt about the extent of the Billings influence on Garrison's career. While Billings was Garrison's model, they were of almost opposite character. Billings was very much a man of the world, Garrison was a man of the world of books and music. Both shared an intense devotion and need for literary work, and both seemed somewhat distant to those who worked with them. For all of his association with Billings, which included the writing of a 430-page biographical memoir, Garrison was in the Billings home only once, very briefly, to deliver some papers late one evening.[6]

Surely the intellectual climate of the Library and the example of Billings and Fletcher could easily account for Garrison's interest in the history of medicine. That interest, however, as intense as it was to become, was late in starting. It was not until fifteen years after he began to work in the Library that Garrison, then 36 years of age, published his first historical paper, a short biographical note in the *Old Dominion Journal of Medicine and Surgery* of 1906 about James B. McCaw, the father of Garrison's chief at the Library, Major W.D. McCaw.[7] The June 1906 issue of the *Medical Library and Historical Journal* carried another Garrison paper, this one about the Surgeon General's Library.[8] A brief editorial by A.T. Huntington in the same issue of the *Journal* is supposed to have been a strong stimulus to Garrison's future work.[9] Huntington, a medical librarian in Brooklyn, bemoaned that one subject—medical history—stood in striking need of more work by American and British authors. What does one find in English on the library shelves? he asked—only antiquated and inaccurate histories and a small number of special monographs demonstrating the kind of scholarship of which

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5. Quoted by Hume, op. cit., p. 307, who took it from Garrison's *John Shaw Billings, A Memoir* (New York: Putnam's, 1915), p. 276. A new work on the history of *Index Medicus* is John B. Blake, ed., *Centenary of Index Medicus 1879-1979* (Bethesda, Md.: National Library of Medicine, 1980).

6. Hume, op. cit., p. 308. To Charles Perry Fisher, the Librarian of the College of Physicians, Philadelphia, Garrison wrote in 1914 asking for information about Billing's Pennsylvania career. Garrison noted, "...I don't suppose he was popular with many members of the profession, on account of his manner which has been described by one of his friends as 'cold and distant,' by another 'occasionally brusque and austere.'" Letter, F. H. Garrison, to C.P. Fisher, 31 January 1914, Historical Collections, Library of the College of Physicians of Philadelphia.

7. "James Brown McCaw," *Old Dominion Journal of Medicine and Surgery* 5(1906): 65-6.

8. "A sketch of the Library of the Surgeon-General's Office," *Medical Library and Historical Journal* 4(1906): 211-16.

9. Ibid., pp. 221-22.

we might be proud. For complete histories we had to turn to the French and German writers, whose heavy, wordy tomes did not really meet our needs.

Huntington suggested that an American medico-historical association be formed, and that groups of scholars work together to produce a proper history. He believed that the time was ripe for such a society, as well as for a complete history of medicine written in English. Surely Garrison read this editorial, since it appeared only a few pages after his own paper. Just how much of a stimulus he needed and how much Huntington's call provided we can only guess. What is of interest is that in less than seven years he did finish a major book on the history of medicine. This was not an overly long time, considering the magnitude of the task and the scope of the accomplishment.

The Library, with its rich collection of the older medical works, was obviously an ideal setting to arouse an interest in the history of medicine. According to Henry Sigerist, Garrison's neighbor and co-worker in Baltimore during the last three years of Garrison's life, he went into medical history by necessity. Because his salary at the Library was insufficient to support a growing family, it occurred to him that medical history might be a profitable venture. The only preparation for this work was his general culture, which included wide interests and vast reading, and his immense bibliographic knowledge. Doubtless there is some truth in Sigerist's interpretation, but it does not account entirely for Garrison's motivation.[10]

To George H. Simmons, editor of the *Journal of the American Medical Association,* Garrison explained that his mind was developed not by book learning but

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10. Arthur J. Viseltear, "The George Rosen-Henry E. Sigerist Correspondence," *Journal History of Medicine* 33(1978): 281-313; 290. To his wife Clara, Garrison wrote in 1914 that he was "...going to try to make all the money I can writing editorials, which only cost me about ten to fifteen minutes brain pumping each." Solomon R. Kagan, "Letters of Colonel Fielding H. Garrison," *Medical Record* 151(1940): 235-37; 235; also in Kagan, 1948, p. 35. In contradiction to Sigerist and to the sentiment he expressed to his wife, Garrison wrote his medical-historical colleague Victor Robinson in Philadelphia: "The Europeans do not realize that the medical and other sciences are only just beginning over here, and that articles in scientific periodicals are seldom compensated for in money, as in the older and more highly specialized civilizations. I have been paid even for a small obituary notice in the *Lancet*, but have never received a cent for thousands of pages sent to American periodicals." Letter, F.H. Garrison to Victor Robinson, 24 February 1921, Robinson manuscripts, N.L.M., Box 7. To Robinson in a letter on 9 March 1921, Garrison added, "As you know, I have not written for money. I have written hundreds of pages to help the cause of history of medicine without compensation." From 1925 until 1935 Garrison wrote many articles for the *Bulletin of the New York Academy of Medicine,* for which he was undoubtedly paid. This arrangement may have been what Sigerist had in mind. The New York Academy articles have been conveniently brought together in a book of 989 pages: Fielding H. Garrison, *Contributions to the History of Medicine* (New York: Hafner, 1966).

by intense suffering, particularly in connection with my father's lingering and painful death [10 September 1908], which occupied three years. I began to write papers during those long nights to keep from going crazy, and I have continued to do so, simply to keep alive mentally speaking, and not become submerged in this bibliographical drudgery which puts out eyes and bores holes into the brain.[11]

II

To understand the *History*, one must know the historian. After reading much of Garrison's prodigious published work in the history of medicine, and after sampling many hundreds of the staggering numbers of letters that he wrote—some are six or eight pages long, and were written in his neat, tight, rather small but easily legible hand—one cannot help being drawn to this shy and sensitive man.[12] As he appears in the lines, and between the lines, of page after page of his correspondence, he was a highly driven, sometimes tortured, extremely erudite man. I have come to like Fielding Garrison and at times to feel intensely his private sensations of injury, knowing full well that he had some peculiar traits, that he was mildly to moderately paranoid at worst, very sensitive at best, and that the word "workaholic" must have been invented just to characterize him.

Garrison was not an easy man to know. As his letters reveal, he had long and bitter quarrels, even with old friends such as Arnold C. Klebs, the Swiss medical historian. Slights and perceived insults wounded him quickly and would call forth vituperative prose. He was considered diffident with strangers and even at times with his friends. He has been characterized in print as brilliant, tempermental, and somewhat peculiar. Henry Sigerist wrote, "Sensitive as a mimosa, he would open his heart to friends, but if ever so slightly touched, would close himself up hermetically."[13] In 1937, two years after Garrison's death, Sigerist and Sanford V. Larkey, Garrison's successor at the Welch Library, described him as very reserved in personal contacts, but

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11. Letter, F.H. Garrison to G.H. Simmons, 5 August 1914. N.L.M. History Division, Box 3, Garrison Papers. In this long, handwritten note Garrison included a number of autobiographical remarks, including "I am a good Tory, believe in a strong Federal Government and hate solemn nonsense, but I am rather stubborn and obstinate, if anyone crosses me, and apt to go my own way if it suits me."

12. Sigerist noted that in response to a 1937 request from the *Bulletin* for any Garrison letters, by 1939 the Institute of the History of Medicine at Hopkins had received about 5000. See Tietsch, op. cit. Unfortunately the book F.L. Tietsch was preparing never came to be. Major collections of Garrison letters are now at the National Library and at Yale (Garrison-Cushing, Garrison-Fulton, and Garrison-Klebs). Many have been printed by Kagan.

As late as 1941 Tietsch was apparently still collecting letters and working on the project. To Dr. Herman Radin he wrote: "Incidentally, recent world events throw some of Garrison's statements out of gear, and the man who looked upon the post-war period in bewilderment, now finds himself caught between two wars. Altogether, I do not think that the present time would be propitious for the publication of the book...." Letter, F.L. Tietsch to H.T. Radin, 9 March 1941, N.L.M. Box 3.

13. Henry E. Sigerist, Obituary notice, *Bulletin History of Medicine* 3(1935): 404.

> ...he was exuberant in his letters. His moods and whatever worried him found expression in his letters. Letter writing was his way to free himself from oppressing thoughts, and he not seldom passed harsh judgements on matters and people.[14]

Garrison apparently was a poor conversationalist and an even worse public speaker, though he was often called upon for both of these activities. He hated small-talk, but he would shine when conversation turned to a subject that he liked. The Baltimore businessman, F.L. Tietsch, who shared musical interests with Garrison, described him aptly:

> At first meeting often shy and humble to the point where he made others feel almost ill at ease, the subject of music would invariably bring forth the brilliant conversationalist in him, and his stiff reticence would give way to warm relaxation.[15]

Many agreed that Garrison's phenomenal memory and keen interest in all phases of learning provided him with an incredible fund of information. Insomnia forced him to be a voracious reader of novels, historical works, philosophical treatises, and the literary classics of all periods. His letters and published writings are filled with reference to his astoundingly broad learning.[16]

If ever a man could be known through his letters, it was Fielding Garrison. To his friend M.G. Seelig he wrote: "...some people say my personal letters are better reading than what I print, although dashed off at a furious pace..."[17] H.L. Mencken, with whom Garrison often corresponded, knew that Garrison loved to gossip in his letters, but also that he could "...cut loose seriously and had something really interesting to say."[18]

William Welch, who ultimately recruited Garrison to head the newly built Welch Medical Library in Baltimore, was a long-time admirer. "I get no letters half as good reading as yours. You have the best art," he wrote to Garrison in 1925.[19] In that year Welch sent a Garrison letter to Abraham Flexner, who apparently had never met Garrison and thought him a rather humdrum

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14. Sigerist and Larkey wrote this in a mimeographed letter sent in 1937 to all Garrison correspondents who might have letters from him in their possession. The copy I saw was addressed to Harvey Cushing and is in the Garrison-Cushing correspondence at Yale.

15. F.L. Tietsch, "The Colonel Played the Piano," *Bulletin History of Medicine* 5(1937): 353-68; 354.

16. The discussions of a wide variety of authors and their works occur in a large number of his letters. Many are filled with long quotations or with numerous references. To his friend the anatomist and historian Edward C. Streeter, Garrison confessed in 1920: "I manage to read a French novelette every night after the heavy stuff is over. It gets me in the right trivial frame of mind for sleep." Kagan, 1938, p. 127.

17. Letter, Garrison to Seelig, 11 January 1925, Kagan, 1938, p. 167.

18. Letter, H.L. Mencken to F.L. Tietsch, 29 August 1938, N.L.M., Box 3.

19. Letter, W.H. Welch to F.H. Garrison, 9 July 1925, in Welch Papers, Johns Hopkins Medical School Archives.

person. He was anything but, Welch assured Flexner.[20] After reading the Garrison letter, Flexner replied:

> It does certainly make a different impression from the one I got from his History of Medicine, which is the driest encyclopedic sort of thing I ever read or looked into. I don't see how a man that [sic] has the literary and cultural interests that Garrison's letter shows could possibly have completed that hideous but useful book.[21]

Almost any of the letters reveals the Garrison style. His ability to evoke an image may be seen in a note written to Harvey Cushing in 1931: "I see the tail of a greenish kite in the distance which in this Baltimore summer haze, looks like a spirochete under a dark field, so I must wriggle conclusionward."[22]

In the letters Garrison revealed his hopes, his frustrations, the tediousness of the daily bibliographical grind, the vexations of almost continual interruption by visitors to the Library, as well as his opinions of the works of other scholars. Very few of his works measured up to his own exacting standards. In 1924 he wrote to Arnold Klebs that the recently completed history of pediatrics would be

> the last lengthy *arbeit* I shall probably put over, and the best I've ever done, as my heart was really in the thing. I should like to have been a specialist in children's diseases, as I have learned to love the little people—far preferable to adults, I think.[23]

More common in Garrison's letters is a melancholy estimate of his own work. In 1925 he wrote to Seelig that

> ...nothing I have ever written satisfies me, as I have nearly always had to do it between trains and in a hurry. The wonder is that over-burdened chaps like you and I [sic] have ever time to do any historical or literary composition whatever.[24]

It is important to remember, as Genevieve Miller's Garrison Lecture (1974) so clearly showed, that most of the medical history written in the first half of the twentieth century was prepared and finished by men who led busy lives and had

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20. Letter, W.H. Welch to Abraham Flexner, 23 April 1925, Welch Papers. Welch had hoped Garrison would be interested in the chair in medical history. He did succeed in luring Garrison to be the first director of the Welch Medical Library.

21. Letter, Abraham Flexner to W.H. Welch, 28 April 1925, Welch Papers.

22. Letter, F. H. Garrison to Harvey Cushing, 29 May 1931, Yale Medical Library.

23. Letter, F. H. Garrison to Arnold C. Klebs, 15 May 1924, typescript in N.L.M. This letter was written from Manila, toward the end of a two year tour of duty in the Philippines. This was Garrison's only military duty, except for brief training stints, outside of the Surgeon General's Library during his entire military career that began in 1917 and ended with his retirement in the rank of Colonel in 1930. See Appendix A, Kagan, 1948. He served the Library as a civilian from 1891 until he entered active duty with the rank of major in 1917. It was a great disappointment to him that he was not sent to Europe before World War I ended. He little realized that he was not much suited for war-time medical duties. He did not enjoy his Manila tour, and especially complained of the oppressive heat and humidity.

The history of pediatrics to which Garrison referred appeared as a 170 page section in Isaac Abt's *Pediatrics*, 1923. Dr. Abt had been a Hopkins schoolmate of Garrison's. Abt's son, Dr. Arthur F. Abt, brought out a new edition with chapters added about recent pediatrics (Philadelphia: W.B. Saunders Co., 1965).

24. Letter, F.H. Garrison to M.G. Seelig, 21 June 1925, Kagan, 1938, pp. 172-73.

full-time careers in medicine or other fields.[25] In Garrison's case, it is the more remarkable that despite many duties at the Library he was able to write so much. His complaint to Charles Singer (1927) is typical of what he occasionally wrote in his letters:

> ...if you realized under what difficulties I have worked in my life, you would wonder that I have been able to accomplish anything at all—constant, never ending bibliographical grind, innumerable distractions and interruptions, next to no leisure, and anything but the physical endowment one should have for excruciating toil, let alone failing eyesight for close work after a certain period.[26]

Perhaps the most vivid way to characterize Garrison is to borrow a phrase from Anthony Lewis of the *New York Times,* and to call him a man who was abroad at home, an alien among men of his own time. "I am myself," Garrison confided to Klebs in 1931, "partically a foreigner over here, in that I have a Latin mind which sees things...quite different from that of other hombres americanos. At any rate, I have always felt a lonely person over here."[27]

World War I, when Garrison was first commissioned as an army officer, was a profoundly unsettling time for him. The "cussedness of the rackety, post-bellum world we live in, a world in which I would fain not dwell, if I had any say in the matter," he characterized it.[28] It was an age lacking in ideals, anti-intellectual in approach; "The good old days, when American civilization really reached a respectable stage was the time of Emerson, Lowell, O.W. Holmes, Weir Mitchell, Jacobi, and Billings."[29] Decline began with the Spanish-American War, Garrison wrote to Charles Singer, a time when a new American, derived mainly from the great West, came into being. But since the World War, "...the intellect of this species has been visibly and audibly going backwards...Since the War, I have lived, though highly sociable by nature and surrounded by people, the life of a very lonely man, marooned on a desert island."[30]

Even among the "medico-historical people," Garrison complained to Singer, he found "...a good deal of this roughneck outlawry."[31] To Francis R. Packard,

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25. Genevieve Miller, "In Praise of Amateurs: Medical History in America Before Garrison," *Bulletin History of Medicine* 47(1973): 586-615. For a good review of the teaching of medical history see also Dr. Miller's chapter in *The Education of American Physicians,* edited by Ronald Numbers (Berkeley: University of California Press, 1980), pp. 290-308.

26. Letter, F.H. Garrison to Charles Singer, 27 June 1927, Kagan, 1938, pp. 193-4. In 1926 Garrison explained to Klebs that he had so many interruptions at the Library that he could do his own work only at home after office hours. Letter, F.H. Garrison to A.C. Klebs, 1 September 1926, typescript in N.L.M.

27. Letter, F.H. Garrison to A.C. Klebs, 3 June 1931, typescript, N.L.M.

28. Letter, F.H. Garrison to M.G. Seelig, 21 June 1925, Kagan, 1938, pp. 172-4. To Howard Kelly, Garrison complained of being war-weary, and wished he could sleep the rest of his life. Letter, F.H. Garrison to H. A. Kelly, 30 December 1920, in manuscript collections New York Academy of Medicine Library.

29. Letter, F.H. Garrison to Charles Singer, 27 June 1927, Kagan, 1938, pp. 193-4.

30. Ibid.

31. Ibid.

editor of the *Annals of Medical History,* Garrison wrote in 1916 that, "It seems odd that a quietistic subject like medical history should occasion so much feeling among men, but it is a fact. I have encountered so much of it here and there that I am almost tempted to drop the subject."[32] "The time is not ripe in America," he wrote in 1927, "for appreciation of scholastic work, although Dr. Welch seems to think otherwise. I simply happened along as a skirmish liner and pioneer and did the best I could over rather rough ground, although with more relative ability than most, which again is not claiming very much."[33]

Occasionally this feeling of alienation found its way into print. For instance, in the fourth edition of the *History* Garrison described modern physicians in terms of efficiency, an ideal typical of the Progressive Era. He said that they are influenced despite themselves, by the social forces that impinge upon them. But he could not resist adding: "It is a noticeable fact that the picture of Americans of the Civil War generation have a more sincere and ideal look than those of the present time."[34]

III

This man of letters, who by all his acquaintances and readers was deemed a graceful and voluminous writer, did not publish his first signed paper until 1906, when he was 36 years old.[35] "A Sketch of the Library of the Surgeon-General's Office," written with economy of words, described the history and growth of the Library and the evolution of its two major bibliographical publications, the *Index Catalogue,* which listed the Library's large and growing holdings, and the *Index Medicus,* the highly useful guide to the current periodical literature. Garrison also

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32. Letter, F.H. Garrison to F.R. Packard, 9 September 1916, Historical Collections, Library of the College of Physicians of Philadelphia.

33. Letter, F.H. Garrison to Charles Singer, 27 June 1927, Kagan, 1938, pp. 193-4.

34. P. 751. It is important to remember, in fitting Garrison into his time, that he came to maturity in the decade of the 1890s, a time denoted by Henry Commager as a watershed decade in American history. See especially his *The American Mind, An Interpretation of American Thought and Character Since the 1880's* (New Haven: Yale University press, 1950); and Henry F. May, *The End of American Innocence, A Study of the First Years of Our Own Time, 1912-1917* (New York: Alfred Knopf, 1959), reprinted 1979 by Oxford University Press. A more recent book that clearly discusses some of the tensions faced by Garrison's generation, one that was born in the nineteenth century but was forced to live in the twentieth, is Thomas L. Haskell's *The Emergence of Professional Social Science. The American Social Science Association and the Nineteenth Century Crisis of Authority* (Urbana: University of Illinois Press, 1977).

35. "A sketch of the Library...," op. cit. Dr. W.D. Miles, in the manuscript of his as yet unfinished history of the Library, refers to a 1902 article about it in the *Bulletin of the Medical Library Association* 1 (1902): 70-84, which he ascribes to Garrison. The article itself does not carry his name on it, but the N.L.M.'s copy of that journal has Garrison's name written on the first page of the article as the author. More conclusive proof that this indeed was Garrison's first published paper comes from his own lengthy bibliography cited in note 36, at the beginning of which he lists himself as the author of that paper. Heretofore all Garrison bio-bibliographers have said that he published his first paper four years later, in 1906.

described the working of the Library, its methods of cataloguing, and the scope of its collection. As early as 1906 he spoke of it as not merely the Library of the Surgeon-General's Office (its official title) but as the "...National Medical Library by reason of its extent and value and its situation in the capital city..." Except for a very brief paper, also published in 1906, it was not until 1909 that Garrison's name again appeared in the medical literature, but from 1909 to 1935, the year of Garrison's death, not a single year was to pass during which he published less than four contributions. Often he wrote eight to twelve essays, editorials, and essay reviews in a single year, in addition to numerous books and forewards.

Since Garrison's main tasks at the Library involved assistance with the several bibliographic publications, it should not be a surprise that the *History* is, in part, a bibliographic guide; nor that its genesis is to be found in a bibliography of the historical collection of the Library. This may be seen clearly in the correspondence with Dr. George H. Simmons, editor of the *Journal of the American Medical Association,* in a long article about the medical classics in the Library which appeared in the *JAMA* in 1911, and in an even longer bibliography illustrating historical texts published up to 1800 that was printed in the *Index Catalogue* in 1912.[36] In these works we can see clearly the development of the important book which was to appear at the end of 1913.

The correspondence between the Library and the *Journal of the American Medical Association* regarding Garrison's historical work began in late March 1911 with a letter from the Librarian, Major Walter D. McCaw, to Dr. Simmons in which McCaw mentioned the large collection of first editions of great works in medicine. McCaw then elaborated:

> Dr. Fielding H. Garrison, the Assistant Librarian, has written a critical essay of some length describing this collection, with remarks upon the writers and the general trend of medical science in the different centuries, which appears to me to be of exceeding great interest not only to medical men but to scholars generally. The paper when finished will be not less than 15,000 words in length and, if possible, I should like very much for it to appear in your journal.[37]

It was published in the issue of June 17, 1911.

Apparently Simmons raised the possibility of publishing an extended version in book form. Garrison, in responding to Simmons in late April 1911, concluded that:

> Such a book, if you wished to print it, could be made more attractive and saleable if its contents were remodelled according to the following title: 'A Handbook of the History of Medicine, based upon the historical collection in the Library of the Surgeon-General's Office. With select bibliographies, chronological data, specimen extracts, and examination questions.' If you should favor this idea, I could turn out for you in time for Fall publication, a little book which would give the average practitioner just what he wants to know about medical history.[38]

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36. *Index Catalogue of the Library of the Surgeon-Generals Office,* 2nd Series, volume 17, 1912, pp. 89-178, and as a separate printing in the same year.

37. Letter, W.D. McCaw to G.H. Simmons, 29 March 1911, N.L.M., Box. 3.

38. Letter, F.H. Garrison to G.H. Simmons, 24 April 1911, N.L.M., Box 3.

In a letter written to Simmons early in May, Garrison realized that the project might be too much for the American Medical Association, but he wanted to finish the task before the warm Washington summer began.[39] Apparently he continued to receive encouragement from Simmons, because in late August only the appendices and bibliographies needed completion. The latter Garrison would have been willing to omit, since they were independent of the text. It is fortunate that they were retained, since they came to be a valued part of the book.[40]

On October 18, 1911, Garrison sent off to Simmons the completed manuscript, which he described as

> a history of medicine, originally based upon the collections of medical classics in this library, but so amplified as to make it a good handbook for the general practitioner's perusal and reference. In each period a full account of all the important men and books is given, and followed in the later periods by a separate section on the cultural phases, social and governmental improvements of medicine.

Garrison wrote to Simmons that judging from the letters he received after the bibliographic part appeared in a June number of the *Journal,*

> I have every reason to believe such a book, if published, might have a successful sale among practitioners. In preparing it, I have aimed to put the average reader in a way to acquire his own medical culture by giving him what he wants to know in a simple, direct manner, and I have tried to put into the book the net result of the best modern research, in regard to which I have had unique advantages in twenty years work in this library.[41]

Garrison gave special attention to the chapters on medicine of the nineteenth and twentieth centuries, because most recent histories of medicine were weakest here, and because this was the part which most interested him.[42]

As late as the first day of November, Garrison was still writing hopefully to Simmons, continuing to explain his approach to history. A primer, Garrison wrote, was what he had originally intended, "But on taking my bearings, I found that such a vast subject as medical history could not be compressed into such short space without telling next to nothing about it." A scholarly work, such as Sir Clifford Allbutt had written for the recent edition of the *Encyclopaedia Britannica,* was not suitable for the ordinary physician, Garrison believed. He was quite willing, he told Simmons, to remove all appearances of unnecessary erudition from the body of the text.[43] Whether the book was too long, or too erudite for the American Medical Association to undertake we do not know. On November 10, 1911, Simmons wrote to Garrison that he was returning the manuscript because he was "a little doubtful as to the advisability of the Association undertaking the publication of such a book." So with this rather cryptic rejection, one that Garrison did not mention in any letter that I have so far

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39. Letter, F.H. Garrison to G.H. Simmons, 2 May 1911, N.L.M., Box 3.
40. Letter, F.H. Garrison to G.H. Simmons, 21 August 1911, N.L.M., Box 3.
41. Letter, F.H. Garrison to G.H. Simmons, 18 October 1911, N.L.M., Box 3.
42. Letter, F.H. Garrison to G.H. Simmons, 23 October 1911, N.L.M., Box. 3.
43. Letter, F.H. Garrison to G.H. Simmons, 1 November 1911, N.L.M., Box. 3.

read, he was forced to turn elsewhere if he was to enjoy having the first of his many large projects see the light of day.[44]

The full story of how the book came to the W.B. Saunders Company may never be known, since the company has not preserved its early correspondence. Garrison was looking for a publisher in 1912. In early September, nearly a year after the final rejection from the American Medical Association, Garrison wrote to his wife Clara from Philadelphia that he had interviewed several medical publishers. He added that, "They have all published medical histories before without success and only one of them was favorable, but he was the best of the lot, the one I should have preferred, and I have great hopes of him."[45] Whether the "best of the lot" was Saunders, I do not know, but hope turned to reality within three days. On the ninth of September, 1912, Garrison wrote again to Clara with the good news: "You will be glad to know that I got a very nice friendly letter from Saunders, the Philadelphia medical publisher, very encouraging in every way, and I am to send them my manuscript directly when I get home. I'll put in my waste time here in touching it up, and shall have to work hard during the autumn to finish it if they want it good and plenty."[46] Thus began a long relation, not always smooth, with the venerable Philadelphia publisher.

IV

Since the prefaces to the four editions of Garrison's *History* are explicit, it is easy to discern the aims and the approach. His main audience, as he stated both in the preface and in later letters, consisted of the medical student and the busy practitioner. He wished to provide "a large number of important facts which may be of use in his professional work or desirable to know as part of his medical culture."[47] He wanted the book to be an outline or sketch, not a finished painting. He hoped that his guide would not be compared to the exhaustive medical histories of Haeser or Neuburger. His research was not original, but he hoped to promote further study by his readers. As he pointed out in the second edition, he never regarded his work "as anything but a primer or guide-book to a territory of vast dimensions."[48] In the third edition, Garrison was pleased to report that his aim of stimulating students had in some measure been attained, judging from the "large number of friendly and sympathetic letters received..."[49] In method, his

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44. Letter, G.H. Simmons to F.H. Garrison, 10 November 1911, N.L.M., Box. 3. And in apparent effort to lessen the pain of rejection, Simmons added on 5 December 1911 that he doubted if the A.M.A. wished to publish any book at that time.
45. Letter, F.H. Garrison to Clara Garrison, 6 September 1912, Kagan, 1948, p. 30.
46. Letter, F.H. Garrison to C. Garrison, 9 September 1912, Kagan, 1948, p. 31.
47. 1st ed., 1913, p. 9.
48. 2nd ed., 1917, p. 8.
49. 3rd ed., 1921, p. 8.

research was distinctly that of the bibliographer: the verification of facts, dates, and bibliographical references. What this excessively modest judgment ignores, of course, is an immense amount of reading and an ability to digest large quantities of facts, trends, associations, and events. Garrison never claimed to be an analytic historian, and the interpretive task of the historian is one that he ventured gingerly. "Opinions," he wrote in 1917, "may be wrong: facts, if accurately stated can never be."[50] In 1915 he wrote to Dr. Victor Robinson that although he considered himself a pretty good biographer, his attitude toward medical history was mainly interpretive.[51] Insight was not one of Garrison's strengths.

That Garrison was an astute observer of the medical developments of his own time stemmed, no doubt, from his bibliographic task of editing *Index Medicus,* which he did from the 1890s until 1927. His duties enabled him to observe events as well as trends. Evidence of this may be seen throughout the final chapters of the *History.* In discussing Paul Ehrlich's work on both immunology and hematology, for instance, Garrison remarked that the trend of recent medicine from the bacterial theory of disease toward the biochemical was clearly evident here.[52]

In the first edition and in subsequent editions Garrison included a chapter on the twentieth century that he subtitled, "The Beginnings of Organized Preventive Medicine," in which he discussed scientific as well as cultural and social aspects. In the fourth edition he added a final chapter of fifty-seven pages titled "Cultural and Social Aspects of Modern Medicine." Here one can see most clearly his views of the world and his opinions about many things. While his intention may have been to try to compass the contemporary history of the first three decades of the twentieth century, its execution left much work to be done by those of us who follow him. Much of the material in the final chapter refers to nineteenth century events, the first two decades of the twentieth century being given minimal coverage. There are some figures for costs of medical care and numbers of physicians, with comparisons between the nineteenth century and the period between 1910 and 1920. When all is said and done, however, the entire medical history of the twentieth century is still in need of analysis and description.

To late twentieth-century readers, Garrison's writing, like that of Osler and his erudite contemporaries, seems a little turgid, and full of bits and snippets quoted from classical writers or nineteenth century essayists such as Emerson.

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50. 2nd ed., 1917, p. 8. His bibliographic approach is also clear in his article "The Uses of Medical Bibliography and Medical History in the Medical Curriculum," *JAMA* 66 (1916): 319-24. The bibliographic method, Garrison wrote, will be as useful in keeping medical records as in historical research.

51. Kagan, 1948, p. 32. Kagan quoted from the letter but did not reproduce it.

52. 4th ed., 1929, p. 710.

Like many other writers of his time, Garrison was often torn between the exhilaration implicit in the concept of progress in medicine and science, and the gloom that afflicted so many in the western world after the first World War. "Decline," as so clearly defined by Oswald Spengler and others, is often mentioned in Garrison's copious personal correspondence.

The progress and advance of medicine, with focus mainly on those who brought it about, form one of the main themes that runs throughout the thousands of pages of the four editions of Garrison's major book. The theme of progress is also apparent in the scores of essays that he published in the years 1906-1935.

Garrison stated his views clearly in an essay published in the *Bulletin of the New York Academy of Medicine* in 1929, the year of the fourth edition. In "Medicine As An Agency in the Advancement of Science, Art and Civilization," he argued that medicine was remarkably prominent and efficient as an agency of advancing science in periods of intellectual ferment such as those of Periclean Athens, Renaissance Europe, or the post Napoleonic period. In quieter times, such as the seventeenth century or the Victorian era, medicine was advanced to a significant extent by scientists and others of the non-medical world.

For Garrison the historical records and sources for medicine were to be found in the secular histories of nations, in governmental archives, in medical texts, in tradition, and by no means least important, in medical biography. "To physicians," he wrote in 1928, "medical biography is one of the best modes of preserving historical data and the most simple and direct line of approach to medical history."[53] Biography was no simple art, according to Garrison. Even among professional men of letters, few have any specific talent for it. The essentials for constructing biography were not limited to mere reconstruction of the events of a life, Garrison believed, but "...a definite evocation of personality, character and achievement in relation to time and place." The finest examples of the art were Plutarch's *Lives,* Boswell's *Johnson,* and Carlyle's *Frederick.* These great writer-biographers, Garrison noted, could make you "see and feel" their subjects.[54]

Dr. Claudius F. Mayer, a junior colleague at the Army Medical Library, was the first to compile a list of Garrison's writings. Mayer, educated in Europe, was quite correct, I believe, in that archival research is not what Garrison enjoyed, nor did he do much of it.[55] What pleased him most was the art of medical biography

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53. "Available Sources and Future Prospects of Medical Biography," *Bulletin New York Academy of Medicine* 4 (1928): 586-607; p. 586, also in *Contributions to the History of Medicine,* op. cit., pp. 697-718.

54. Ibid.

55. Claudius F. Mayer, "The Literary Activity of Fielding H. Garrison, M.D.," *Bulletin History of Medicine* 5(1937): 378-403, which contains a bibliography of his writings, later made more complete by Kagan.

and historical synopsis. To Garrison, as to one of his literary heroes, Carlyle, the essence of history was composed of innumerable biographies. Of thousands of pages of Garrison's published work, Mayer estimated that fully one-fourth dealt with the life history of scientists and physicians. The *History* greatly swells that fraction, since much of it consists of biographical synopses.

Garrison's one venture into the realm of full-scale biography was also one of the most tiring and draining of his literary enterprises. "Never again," he wrote to his wife Clara in 1914, after completing the 430-page life of his mentor and inspiration, John Shaw Billings. As Garrison revealed in letters to Victor Robinson, he undertook the task out of loyalty to the man who first guided his work at the Army Library, and also to please the Billings family. Since Billings died in March, 1913, and the book was published a mere two years later, it is clear that the task was attacked and completed with typical Garrisonian vigor and tenacity. That Billings deserved a full memoir, Garrison did not doubt, but because of his own closeness to the subject he had reservations when he undertook the task.[56] Billings, who has not been the subject of a recent full-scale biography, was one of the few truly "great men" of nineteenth-century American medicine. His influence over the entire process of building medical education at Johns Hopkins, his great bibliographical accomplishment in the *Index-Catalogue of the Surgeon-General's Library* and the *Index Medicus,* and his directorship of the newly formed New York Public Library between 1895 and his death in 1913, make Billings as important to twentieth-century medicine as he was to late nineteenth-century medicine.

Garrison's approach to the history of medicine was broader than mere biography. In 1928 he wrote to Dr. Burton Chance:

> I'm no good at genealogy, indeed loathe grubbing of that kind. What I'm interested in is ideas not bibliographic minutiae—doubtless because I have never been wealthy enough to become a bibliophile.[57]

From the 1913 preface we see that he believed the history of medicine was "...the history of humanity itself, with its ups and downs, its brave aspirations after truth and finality, its pathetic failures."[58] He readily admitted that he did not care for the earlier periods of medicine, nor did he believe that his intended audience, students and practitioners of medicine, wanted more than a general scientific and cultural review. He confided to Klebs in 1913 that he was impatient to finish the book, having worked himself to a frazzle in order to insure accuracy. He also

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56. The Billings *Memoir* (see fn. 5), Garrison later admitted to Victor Robinson, "...was published by the Putnams for his family and at their expense." Letter, F.H. Garrison to V. Robinson, 31 March 1922, Robinson manuscripts N.L.M., Box 7.
57. Letter, F.H. Garrison to Burton Chance, 12 November 1928, Historical Collections, Library of the College of Physicians of Philadelphia.
58. 1st ed., 1913, p. 10.

described his approach:

> Up to the end of the 18th century, I have only attempted to rearrange the work of better men in my own language, and the modern period is the only part in which I attempt to supplement Haeser, Baas, and Neuburger.[59]

To George Sarton, Garrison wrote at the end of 1929:

> In my view, medicine does not really begin to be medicine until after 1850, the time of Virchow, Helmholtz, Ludwig, Claude Bernard, Pasteur and Lister and today, we would rather let the entire historical minutiae of pre-Hippocratic medicine go by the board than lose or miss out the achievements of Röntgen and the Curies, which are the points of departure of modern surgery. I know this sounds like heresy, but it is a fact when you approach the bed-side of the sick and wounded; in other words, 'get that patient well' spells 'medicine'; find out *how* that process in normal or altered physiology comes to pass spells medical or laboratory science. Conjectural or theoretic medicine seems to pale into relative insignificance besides those big directives and objectives (in the military sense of the terms), because they are always asking the non-soluble 'why', instead of the sparingly soluble 'how'. Pure science or applied non-medical science, such as astronomy, geology, mathematics, physics, has much better directives and objectives and had better even than medicine in the past; although I think the initial Hippocratic and Aristotelian statements are correct, that the *method* of Greek science was initially derived from medical (bedside) reasoning.[60]

In 1928 Garrison pointed out to his friend Seelig that there was a vast need for research on the modern period. Revealing his fundamentally bibliographical approach, Garrison emphasized the importance of establishing two essential dates: "When a given discovery or invention was made and when it was made public and recorded, which is terribly messed up..."[61] In contrast, for many who tried their hand at the history of medicine in Garrison's day, and unfortunately for some who write it today, the main question has been "who did what first?" This is, simply put, a rather barren historiographic approach, a necessary part of the story, but no longer sufficient.

The more he became involved with contemporary medicine and its issues, the more Garrison realized the difficulties and the immensity of the task. As he was working on the revision that would become the fourth edition, he wrote to Henry Mencken that "The amount of material to be covered, including what I missed out in Manila is immense. If I ever get the job done satisfactorily, it will be the last round."[62] To Seelig he complained:

> I am nearly dead and half blind from this exasperating attempt at revision, which has discouraged me a good deal, although I hope I have got away with the main currents of the 20th century maze (1901-28). I shall never attempt the job again, for to do justice to 1901-28 would require whole time attention and a degree of enthusiasm which I no longer possess.[63]

One final note about Garrison's approach concerns his emphasis on the role of physicians in the history of medicine. He stated explicitly that the physicians of

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59. Letter, F.H. Garrison to A.C. Klebs, 18 October 1913, Sterling Library, Yale University.
60. Letter, F.H. Garrison to G. Sarton, 21 December 1929, typescript, N.L.M.
61. Letter, F.H. Garrison to M.G. Seelig, 31 March 1928, Kagan, 1938, pp. 197-8.
62. Letter, F.H. Garrison to H.L. Mencken, 8 April 1927, typescript, N.L.M.
63. Letter, F.H. Garrison to M.G. Seelig, 4 February 1928, Kagan, 1938, pp. 195-6.

the past "...reasoning from what seem to us very faulty premises, somehow got their patients well, otherwise they would have had not clientele or following. The thing is to ascertain, if possible, just how they did it."[64] In reviewing *Social Factors in Medical Progress*, written by Bernhard Stern, Garrison detected that Stern's lack of direct medical experience had caused him to overlook the real task of the physician. "The doctor is at the bedside not to turn the patient into a laboratory animal nor to tattle about him but to get him well, if he can; failing that, to alleviate suffering, to comfort, advise, console sometimes by the effect of his personality."[65]

Although Garrison emphasized the role of the physician in the history of medicine, it is true that he was somewhat of a romantic. Colonel Percy M. Ashburn, Garrison's last superior officer at the Library, a man very widely read in history, made a telling assessment of Garrison's approach to historical work:

> Knowing medicine only from books, many of them ancient and medieval, he had exalted ideas of the philosophy and mystery of medicine and of the nobility of practice which I, who knew practice, could not share, and he often attributed to the ancients a prescience which I did not think they possessed.[66]

V

The preface to the first edition of Garrison's *History* is dated December, 1913. The book appeared at the end of the year and sold well enough to require reprinting in 1914. According to advertisements in *Science* and other journals, the reader was promised a biographic dictionary of the men who had done things, an album of medical portraits, a complete medical chronology, plus data about important diseases, drugs, therapeutic procedures, and operations. The 736-page book sold for $6.00 or $7.50 in half-morocco binding. In June 1914, Garrison proudly wrote to Clara that Mr. Greene of Saunders showed him several complimentary reviews and told him that the book was selling well. Garrison was happy to report that Saunders was much gratified to be the publisher of the first readable and, therefore successful, history of medicine.[67]

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64. 4th ed., 1929, p. 7.

65. *American Historical Review* 33 (1927): 90-1.

66. Quoted by Hume, "Garrison and the Army Medical Library," op. cit., p. 338.

67. Letter, F.H. Garrison to C. Garrison, 19 June 1914, Kagan, 1948, p. 34. The publishing history of the book, as described in the 4th edition, was as follows: copyright, 1913; reprinted May, 1914; revised, entirely reset, reprinted, and re-copyrighted, June 1917. Ditto, September, 1921, reprinted April 1924, revised, etc., January, 1929; reprinted March 1960, and August, 1960. I have obtained sales figures through the courtesy of Mr. Donald Abbott of the W.B. Saunders Co. Those for the first edition are missing. 3000 copies of the 2nd edition were printed. In a letter to Dr. Edward Streeter, 27 April 1920 (Kagan, 1938, pp. 121-2) Garrison explained that he was forced into a 3rd edition sooner than he expected because a fire in the Saunders warehouse destroyed 500 copies of the 2nd edition. 7000 copies of the 3rd edition were printed and presumably sold. The original printing of the 4th edition was 5000 copies. In March of 1960 an additional 7500 came off the press. By the middle of 1978, 35,500 copies of the 1929 edition were in print, a phenomenal number considering the size and subject of the book.

Most of the reviews were very favorable, and Garrison at once began to collect lists of errors and other suggestions from medical historians around the world. William Osler sent him such a list and wrote from Oxford: "The book seems to have taken over here. I see it very often and recommend it everywhere."[68]

Arturo Castiglioni, the Italian historian of medicine whose large one-volume work on the subject is the treatise most frequently compared to Garrison's *History,* wrote in his own book that Garrison had been responsible for giving the whole subject a great impetus in America. In reviewing American contributions to medical history through the 1930s, Castiglioni was very laconic in his praise. He used the word "interesting" for a few books, and he called Henry Sigerist's publications "vigorous," but he bestowed almost fulsome praise on Garrison. Castiglioni called the fourth edition an excellent volume that

> presents a discriminating survey of the whole history of medicine, which is especially useful for its full treatment of the modern period and of Anglo-American medicine. It is written with an impartiality and a richness of detail which reveal extensive knowledge of the subject and a freshness of style that is none too common in American medical writings.[69]

Castiglioni, furthermore, included a portrait of Garrison, the only English-writing historian so honored.

The reviews of the book, in all its editions, in the medical journals of this country were couched in superlatives. There is almost a tone of ecstasy and true pleasure that one of our own could create such an accomplishment. "Erudite," "exhaustive," "unique," "marvelous," are judgments that appear in the reviews. The *JAMA* reviewed the third edition with these words: "With its first publication in 1913, Dr. Garrison's 'History of Medicine' assumed a place as the best American history of medicine ever published. We are not wont to indulge in superlatives, but the word 'best' is warranted here, if ever." The book, the reviewer concluded, represented a distinct achievement in American medical literature.[70]

In 1914, Garrison's friend Arnold C. Klebs of Lausanne wrote the review for the *Bulletin of the Johns Hopkins Hospital,* a journal that represented a group of physicians in whom Garrison was keenly interested. Calling the book an epochal American contribution, Klebs, a contributor to the historical literature, was especially impressed by the fine, short biographical sketches of Harvey, Boerhaave, Haller, Pasteur, and Virchow. He also marvelled at the amount and extent of material covered that avoided the result of a dry-as-dust catalogue. And in words that must have pleased Garrison immensely, Klebs wrote that Garrison

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68. Letter, William Osler to F.H. Garrison, 26 February 1916, in Harvey Cushing, *The Life of Sir William Osler,* 2 vols. (New York: Oxford University Press, 1925), 2:518.
69. Arturo Castiglioni, *A History of Medicine,* E.B. Krumbhaar, trans. and ed. (New York: Alfred A. Knopf, 1941), p. 941.
70. *JAMA* 78 (1922): 457.

had fulfilled one of his most cherished aims:

> No one, not even the most practically inclined practitioner, if he reads at all, can lay the book aside without feeling lifted above the drudgery of daily routine, without a warmer interest in the aims of his art and science; and, perhaps somewhat humbled in his over-estimation of current advances, he will become conscious of that almost intangible bond of human kinship between those of all times who have made the relief of pain and disease their task.[71]

Klebs doubtless knew well that the author wrote the book to relieve the drudgery of a grinding daily routine.

Not all reviewers were favorable, however. George Sarton, the historian of science, was as harsh and critical of the book's construction as the medical reviewers were high in their praise. Like many other reviewers, Sarton pointed out that Garrison devoted by far the most space to nineteenth and twentieth century medicine. Consequently the book was divided into two parts, the past and the present. What especially annoyed Sarton was the subdivision of the first part, which described the history of medicine prior to 1800. He expressed shock that the Middle Ages received twice as much space as the classical period. Observing how much we owe to the Greeks and how little to medieval physicians, Sarton believed that Garrison revealed "monstrous ingratitude." Garrison was led to assume this "criminal attitude," Sarton supposed, by the number of new studies being devoted to medieval medicine. "But the amount of attention paid to a subject is no measure of its real importance."[72]

In his review of the fourth edition, Sarton again bemoaned the neglect of ancient medicine. He called the general structure wrong for the whole period that preceded the sixteenth century. Sarton now objected also to some of the chapter titles, calling the "Mohammedan and Jewish Periods 732-1096," a "queer" title, a "childish" account, and he wondered why the year 1096 was chosen. The medieval period, limited by the dates 1096-1438, was similarly difficult for him to understand. Despite all this, Sarton praised Garrison for the "very abundant harvest of facts and ideas." He realized, too, that the full account of more recent medicine was probably the kind of history which would best serve the needs of the main audience—medical students. It is interesting that although Sarton excelled as a bibliographer, he did not comment on Garrison's bibliographically oriented approach to the history of medicine.[73]

Garrison admitted that Sarton's review had been slashing, but denied that it had affected his cheerfulness, nor did he bear any malice. "I will not attempt to defend my position with reference to the earlier periods, which is that I merely attempted to give in compact, intelligible form what others have taken many

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71. *Bulletin Johns Hopkins Hospital* 25 (1914): 284-85.
72. *Isis* 4 (1922): 554-56.
73. *Isis* 13 (1929): 137-38.

pages to expound."[74]

VI

I now come face to face with the task of a fifth edition. Before proceeding with the problems of writing about the history of twentieth century medicine, I have tried to understand Garrison's methods. In 1947 George Rosen, in a letter to Henry Sigerist, wanted to know upon what theory Garrison approached history. Rosen could not readily discern one, and Sigerist agreed that Garrison had no definite theory of history.[75] After reading hundreds of letters and several thousand of his printed pages, I no longer can agree with their simple dismissal of any philosophical underpinning to Garrison's historical approach. Not to enunciate one's philosophy is itself an approach. As I have tried to show in the preceding pages, Garrison proceeded systematically and with definite plans and goals. Unfortunately for my task, one value of the book is its quality as a work of reference. Such a compilation for the twentieth century part will not be feasible or even desirable, it seems to me.

Surely one must now write from the vantage point of a different medico-historical world view, a view from the 1980s. Garrison's focus on individuals must be supplemented by concern for the broad social trends and for the organizational milieu that shapes so much of what the physician learns and practices. We can no longer write exclusively from our formerly comfortable iatrocentric point of view. But this leads us to a discussion beyond my present purpose.[76]

It is appropriate, in closing, to quote Jean Nicolas Corvisart, illustrious medical

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74. Letter, F.H. Garrison to G. Sarton, 16 December 1929, Kagan, 1948, pp. 76-77. The entire letter is not printed. Garrison wrote: "The *Isis* containing your review has just reached me, and you have handed me a terrible slashing, but I am quite cheerful about it and bear no malice." Knowing something of Garrison, I find this hard to believe. It is no wonder that to Arnold Klebs he confided in 1924 that, "I never thought much of *Isis;* it seems mediocre in content and, like the *Annals,* invested too much money on paper and format." 15 May 1924, typescript in N.L.M. There are some points of similarity between Sarton and Garrison: both wrote huge numbers of letters; both wrote seminal books in their field that they entitled *Introduction,* although Sarton's was a far more extensive, three volume work; and both had constantly to work from the periphery in fighting for the establishment of their field. In this latter regard, however, Sarton was far more active and important as a discipline builder than was Garrison. For the history of medicine Henry Sigerist played the role of discipline builder that Sarton played for the history of science. See especially Arnold Thackray and Robert K. Merton, "On Discipline Building: The Paradoxes of George Sarton," *Isis* 63 (1972): 473-95.

75. A.J. Viseltear, "Rosen-Sigerist Correspondence," op. cit., p. 289.

76. I have discussed these points at some length in a long chapter on the history of medicine in Paul Durbin, ed., *Guide to the Culture of Science, Technology, and Medicine* (New York: The Free Press, 1980). See also a concise introduction by Morris Vogel in M.J. Vogel and C.E. Rosenberg, eds., *The Therapeutic Revolution: Essays in the Social History of American Medicine* (Philadelphia: University of Pennsylvania Press, 1979).

teacher of early nineteenth century Paris. In 1809, when he brought out his edition of Leopold Auenbrugger's booklet on percussion, originally published in 1761, Corvisart wrote:

> I could have raised myself to the rank of author by revamping the work of Auenbrugger to my own vanity. I have not wished that; it is he, it is his beautiful and legitimate discovery, *Inventum novum* as he says justly, which I have wished to make live again.[77]

It is in this spirit that I hope I may be able to make Fielding H. Garrison's book continue to live. Garrison's own motto is still appropriate: *Feci quod potui: faciant meliora potentes.* I have done what I could: May those who can, do better.

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77. Quoted by Robert P. Hudson, in *Major's Physical Diagnosis,* 8th ed., M.H. Delp and R.T. Manning, eds. (Philadelphia: W.B. Saunders, Co., 1975), pp. 11-12.

Casuistry and Professional Obligations: The Regulation of Physicians by the Court of Conscience in The Late Middle Ages*

DARREL W. AMUNDSEN

Part I

DURING the late Middle Ages moral theologians and casuists directed much attention to defining the moral responsibilities (sins both of commission and of omission) of Christians generally. They also considered the moral responsibilities attached to those in various walks of life. Many of these sources discuss the sins of physicians and surgeons. It is to a sampling of such writings that this study is directed with a view to analyzing the ethical standards that ecclesiastical authorities defined as essential for the Christian physician.

In the twelfth century, with the development of medical and surgical guilds and university faculties and, in some areas, with the imposition of licensure requirements, the practice of medicine was changed from a right to a privilege. This was a period marked by profound changes in the fabric of medieval society. Western Europe was changing from an almost exclusively agrarian to a more urban society. The corporate structure typified by guilds and universities began to constitute the norm of social, economic, and often political organization for an increasingly large proportion of the population. The time was one of great social and economic change, during which a wide variety of new commercial and professional activities arose. The church was engaged in an internal, ideological struggle regarding the spiritual aspects of commercial activity, and the attitudes of canonists and the stipulations of church councils evidence an attempt at adaptation designed to cope with socio-economic change. This is reflected in the fact that while in the *Decretum* of Gratian (c. 1140) all commercial profit seems to have been condemned, even Gratian's earliest commentators did not sustain his views on the activities of merchants.[1] It is especially during the twelfth century that there was a "shift in values within the traditional scheme of the

*I wish especially to thank Ronald Kotre and the Francis Clark Wood Institute of the College of Physicians of Philadelphia for appointing me Visiting Scholar in the Division of the History of Medicine for the summer of 1977. It was then that I located and began to analyze the primary sources used in this study. My appreciation is also extended to Prof. John Norris of the University of British Columbia for his helpful criticism of an earlier draft of this paper.

1. The whole subject is very complex. As a beginning one should see J. Gilchrist's discussion of the economic doctrines of the canonists: *The Church and Economic Activity in the Middle Ages* (London: Macmillan, 1969), pp. 53 ff. On the special problem of usury, see John T. Noonan, Jr., *The Scholastic Analysis of Usury* (Cambridge: Harvard University Press, 1957).

cardinal vices."[2] The primacy of pride as the supreme vice was being displaced by the sin of avarice in theological and popular conceptions. Indeed, as new roles arose and old ones became more complicated, as society itself became infinitely more complex, and as diverse circumstances and situations, which a century earlier could not have been imagined, were encountered either generally or as a consequence of one's calling, canonists and theologians were forced to wrestle with the religious implications of an environment significantly different from that of earlier eras.

As decretists (commentators on Gratian's *Decretum*) sought to apply the old verities to new exigencies, some theologians began to evaluate the vagaries of the contemporary scene in terms of both abstract and practical moral application. Theologians thus engaged during the twelfth century were the founding fathers of what is now known as moral theology. While their discussions were often on an abstract level, their designs were eminently practical. Peter the Chanter, a Parisian theologian of the twelfth century[3] may be taken as an example. His *Summa de sacramentis et animae consiliis*[4] consists of three parts, the first dealing with the sacraments, the second with penance and excommunication, and the third, entitled *Liber casuum conscientiae,* with circumstances for resolving cases of conscience. This work was designed in part to aid confessors in the increasingly difficult task of determining what constituted sin in a society fraught with situations and circumstances not anticipated by the authors or compilers of earlier penitential literature.

Beginning in the sixth century, compilations of canons relevant to sin and penance had been made. The most notable of these are the Celtic or Irish Penitentials.[5] The Penitentials[6] are rather stark lists of sins with appropriate penances given for each offence. Although they recognize levels of responsibility within various categories of sins, they are mechanical, rigid, and inflexible, and their penalties are usually quite severe. By the late twelfth century they appear hopelessly outdated and discordant with the spirit of the age. Additionally, during the tenth, eleventh, and twelfth centuries there was a shift in the practice of penance from a public system of penance to a private system, the latter becoming universal and compulsory in the thirteenth century.[7] With this shift from public

2. L. K. Little, "Pride Goes Before Avarice: Social Change and the Vices in Latin Christendom," *American Historical Review* 76(1971):16.
3. On whom see John W. Baldwin, *Masters, Princes, and Merchants: The Social Views of Peter the Chanter and His Circle* (Princeton: Princeton University Press, 1970).
4. In process of publication in Analecta Mediaevalia Namurcensia (Louvain: Éditions Nauwelaerts).
5. On the history of penance before the thirteenth century, see Oscar D. Watkins, *A History of Penance* (London: Longmans, Green and Company, 1920) and Paul Anciaux, *La théologie du sacrement de pénitence au XII^e siècle,* Universitas Catholica Lovaniensis, Dissertationes in facultate theologica vel in facultate iuris canonici, 2nd series, 41 (Louvain: 1949).
6. For examples of this literature, see John T. McNeill and Helena M. Gamer, *Medieval Handbooks of Penance: A Translation of the Principal Libri Poenitentiales and Selections from Related Documents,* Columbia Records of Civilization: Sources and Studies, No. 29 (New York: Columbia U. Press, 1938).
7. Oscar Watkins, *A History of Penance,* 2:735.

to private penance, the office of confessor inevitably became very prominent. His task now was also much more complex than earlier. He was "no longer the administrator of a hard and fast penal code. He had become a judge in the full sense with the obligation to base his decisions on the principles of the newborn theology."[8] This "newborn theology" was written in great part as a response to the needs to the confessor, whose role had greatly increased in significance and demand in a society in which new and puzzling moral problems were constantly arising.

The literature designed to help the confessor begins to appear in the late twelfth century and assumes a wide variety of forms; it does not lend itself to precise genre classifications. Works retrospectively grouped together under the rubric *Summae confessorum* or *Summae de casibus conscientiae*[9] were written specifically to aid confessors in all aspects of their confessional responsibilities. There is disagreement among scholars as to which works should be thus classified.[10] Suffice it to say that the primary sources that are relevant to resolving problems encountered in the confessional fall into several categories that sometimes overlap, for instance general literature on moral theology (perhaps including specific sections on cases of conscience, e.g., Peter the Chanter's *Summa*), systematic treatments of confession and penance addressed precisely to the needs of the confessor, and short confessional manuals designed as handy

8. F. Broomfield in his preface to Thomas of Chobham, *Summa confessorum,* Analecta Mediaevalia Namurcensia, 25 (Louvain: Éditions Nauwelaerts, 1968), p. xv.

9. On the genre, see Pierre Michaud-Quantin, *Sommes de casuistique et manuels de confession au moyen âge (XII-XVI siècles),* Analecta Mediaevalia Namurcensia, 13 (Louvain: Éditions Nauwelaerts, 1962).

10. When F. Broomfield edited the *Summa* of Thomas of Chobham (cited above, n. 8), he gave Thomas' work the title *Summa confessorum* (c. 1215) and, in his preface, referred to Bartholomew of Exeter (latter half of the twelfth century) as having composed essentially the first recognizable *Summa confessorum.* Leonard E. Boyle, "The *Summa Confessorum* of John of Freiburg and the Popularization of the Moral Teaching of St. Thomas and Some of His Contemporaries," in *St. Thomas Aquinas 1274-1974: Commemorative Studies,* ed. A.A. Maurer et al. (Toronto: Pontifical Institute of Mediaeval Studies, 1974), 2:245-68, writes that John of Freiburg's *Summa* (c. 1297-1298), was the first to be called a *Summa confessorum,* and comments that "the use of this title in editions of pre-1300 works for confessors is anachronistic, as in F. Broomfield, Thomae de Chobham, *Summa confessorum*" (p. 248, n. 18). However, when Thomas N. Tentler, "The *Summa* for Confessors as an Instrument of Social Control," in *The Pursuit of Holiness in Late Medieval and Renaissance Religion,* ed. Charles Trinkaus (Leiden: Brill, 1974), p. 105, refers to Raymond of Peñafort's *Summa de casibus poenitentiae* (c. 1220) as the first *Summa* for confessors, Boyle, "The *Summa* for Confessors as a Genre, and Its Religious Intent," ibid., pp. 126f., writes that the genre was already in existence earlier, "as will be clear to anyone who has had to study the manuals of Robert Flamborough (c. 1210) and Thomas Chobham (c. 1215) ...."

reference works for the confessor.[11] All prove valuable as documents illustrating a serious and concerted effort to subject the broadest spectrum of human activities to Christian moral principles. The result was the birth of Catholic casuistic literature.

In 1215 Pope Innocent III presided over a general church council, the Fourth Lateran, at which various canons of far reaching and significant consequences were adopted. One canon, which Henry Charles Lea called "perhaps the most important legislative act in the history of the Church,"[12] had been precipitated by a century of theological discussion of the nature of penance.[13] This canon, number 21 of Lateran IV, sometimes referred to by its incipit, *Omnes utriusque sexus,* was incorporated into *Compilatio quarta*[14] and, most important, was included in the

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11. The primary sources I have located that have yielded material for this discussion are here listed in order of composition:

Peter the Chanter, *Summa de sacramentis, Liber casuum conscientiae* (1197), ed. by Jean-Albert Dugauquier, Analecta Mediaevalia Namurcensia, 16 (Louvain: Éditions Naumelaerts, 1963).

Robert of Courson, *Summa* (c. 1208-1213), as quoted by J. Baldwin, *Masters, Princes, and Merchants.*

Thomas of Chobham, *Summa confessorum* (c. 1215), cited above, n. 8.

Astesanus de Asti, *Summa de casibus conscientiae* (c. 1317; Venice, 1478), copy at Free Library of Philadelphia; generally cited as *Astesana.*

Bartholomaeus de Sancto Concordio, *Summa casuum* (c. 1338; Venice, 1473), copy at University of Pennsylvania; generally cited as *Pisanella.*

Antoninus of Florence, *Confessionale-defecerunt* (1473; Esslingen, 1474[?]), copy at College of Physicians of Philadelphia.

---------- -- --------, *Summa theologica* (or *Summa moralis*) (1477; 1740; reprint, Graz: Akademische Druck- und Verlagsanstalt, 1959).

Bartholomaeus de Chaimis, *Interrogatorium sive confessionale* (c. 1474; Nuremberg, n.d.), copy at Free Library of Philadelphia.

Baptista Trovamala de Salis, *Summa de casibus conscientiae* (c. 1480; Venice, 1495), copy at College of Physicians of Philadelphia; generally cited as *Baptistina.*

Angelus Carletus de Clavasio, *Summa Angelica de casibus conscientiae* (c. 1486; Lyons, 1494), copy at Free Library of Philadelphia; generally cited as *Angelica.*

Cajetan (Tommaso de Vio), *Summula peccatorum* (1525; Florence, 1525), copy at University of Pennsylvania.

Bartholomaeus Fumus, *Summa Armilla* (c. 1538; Cologne, 1627), copy at Catholic University of America.

12. Henry Charles Lea, *A History of Auricular Confession and Indulgences in the Latin Church* (Philadelphia: Lea Brothers and Company, 1896), 1:230.

13. See J. Baldwin, *Masters, Princes, and Merchants,* 1:50.

14. 5. 14. 3. This is one of the *Quinque compilationes antiquae,* the five most famous decretal collections between c. 1187 and 1226. The actual sequence of composition was *prima, tertia, secunda, quarta,* and *quinta.* All were unofficial collections except for *tertia* (1210) and *quinta* (1226). The entire collection was edited by E. Friedberg, 1882 (reprinted, Graz: Akademische Druck- und Verlagsanstalt, 1956).

Decretales of Gregory IX[15], thus becoming part of officially codified canon law. This canon, which imposed on all Christians who had arrived at the age of discretion the obligation of confessing and receiving the Eucharist at least once a year, warrants quoting in full:

> Every *fidelis* of either sex shall after the attainment of years of discretion separately confess his sins with all fidelity to his own priest at least once in the year: and shall endeavour to fulfil the penance imposed upon him to the best of his ability, reverently receiving the sacrament of the Eucharist at least at Easter: unless it happen that by the counsel of his own priest for some reasonable cause, he hold that he should abstain for a time from the reception of the sacrament: otherwise let him during life be repelled from entering the church, and when dead let him lack Christian burial. Wherefore let this salutary statute be frequently published in the churches, lest any assume a veil of excuse in the blindness of ignorance. But if any desire to confess his sins to an outside priest for some just reason, let him first ask and obtain permission from his own priest, since otherwise he [the outside priest] cannot loose or bind him. But let the priest be discreet and cautious, and let him after the manner of skilled physicians pour wine and oil upon the wounds of the injured man, diligently inquiring the circumstances alike of the sinner and of the sin, by which [circumstances] he may judiciously understand what counsel he ought to give him, and what sort of remedy to apply, making use of various means [*experimentis*] for the healing of the sick man. But let him give strict heed not at all to betray the sinner by word or sign or in any other way, but if he need more prudent counsel let him seek it cautiously without any indication of the person: since we decree that he who shall presume to reveal a sin discovered to him in the penitential tribunal is not only to be deposed from the priestly office, but also to be thrust into a strict monastery to do perpetual penance.[16]

This decree obviously did not institute the practice of confession. Nevertheless, at a time when a concerted effort was being made to establish and enforce uniformity of law and practice within Latin Christendom, such a canon, issued by pope and general council, included in codified canon law, and backed up by the authority to impose the disciplinary sanctions stipulated in its text, had momentous consequences. The decree was thoroughly publicized, reaching every level of medieval churchmen.[17] While it made annual confession mandatory at pain of excommunication, it also required that the confessor be discreet and cautious, "diligently inquiring the circumstances alike of the sinner and of the sin" so that he would know what counsel he should give; and if he needed more

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15. 5. 38. 12. The most important collection of canons in the Middle Ages having the force of law is the *Decretales* of Gregory IX. This, the first official collection of a universal character, rendered all previous collections, whether of an official or unofficial nature, obsolete, excepting the *Decretum* of Gratian, which the official collections did not supplant but rather supplemented. The *Decretales* is part of what became known as the *Corpus iuris canonici,* a title which was first used in 1580 by Gregory XIII and refers to the *Decretum* of Gratian (c. 1140), the *Decretales* of Gregory IX (1234), the *Liber Sextus* of Boniface VIII (1298), the *Clementinae* (named after Clement V - 1317), the *Extravagantes* of John XXII (1325) and the *Extravagantes communes* (1500 and 1503). These were edited by E. Friedberg, 2 vols., 1879 (reprinted, Graz: Akademische Druck- und Verlagsanstalt, 1959).

16. As translated by Oscar Watkins, *A History of Penance,* 2:748 f.

17. Thomas N. Tentler, "Response and Retractatio," in *The Pursuit of Holiness,* p. 134.

insight, he was to seek advice. Although before 1215 literature designed to aid the confessor had been written, it was in great part as a response to the demands of this canon that such writings began to be produced in much greater quantity and addressed most specifically to the thorough education of the confessor in the requirements of the confessional and its diversities and subtleties.

The literature under discussion was written by those who "were considered experts, with special knowledge about penitents, confessors, and confessing."[18] It was written for the priests, for the ordinary diocesan clergy, who did not have at their disposal the great commentaries and specialized writings of the major scholastics. In this literature the complexities of legal and moral prescriptions could filter down in an easily understandable from to those who needed immediate answers. As Thomas Tentler said, they were "reference books designed to give answers, not philosophical inquiries designed to evoke debate."[19] They were intended to simplify doctrine for practical application and were organized so that the confessor could locate answers easily. And the answers he would be seeking centered on sin. Sin, after all, is the subject of confession, and the focus of literature designed to aid confessors was the definition, classification, and scrutiny of sins. As one examines this literature, one sees sins identified everywhere, and articles on vices, activities, and obligations, follow any of a number of systems of categorization.

The *Astesana* (c. 1317) exhorts the confessor to "scrutinize the conscience of the sinner in confession as a physician scrutinizes wounds and a judge a case."[20] Since the completeness of a confession was an absolute necessity for the efficacy of absolution, a thorough examination of the penitent was essential. To such an end the *Summae confessorum,* confessional manuals, and related writings were an indispensable guide. Confessional examination must penetrate into every area of life; nothing is outside its purview: birth, marriage, sex, the rearing of children—indeed, every aspect of domestic, social, and economic life. Under the latter fall the special areas of sin that are attached to various occupations.

Early moral theologians recognized the importance of dealing with the moral implications of various occupations. The initial concern was with identifying the walks of life that were patently sinful (e.g., public prostitutes, usurers). The theologians then sought to single out those which were morally hazardous and hence required special comment. Robert of Courson in his *Summa* (c. 1208-1213) so designated surgeons, physicians, lawyers, procurers, mimes, courtiers, mongers, cooks, and merchants of dubious wares.[21] Taking a different slant on occupations

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18. Thomas N. Tentler, *Sin and Confession on the Eve of the Reformation* (Princeton: Princeton University Press, 1977), p. xiv.
19. Tentler, "The Summa for Confessors," p. 108.
20. As quoted by Tentler, ibid., p. 115.
21. Baldwin, *Masters, Princes, and Merchants,* p. 57.

in the light of Genesis 3:19 and 2 Thessalonians 3:10,[22] that earnings must be commensurate with labor, Robert of Courson devoted one book of his *Summa* to the "hiring of services" (*De locatione operarum*). Here he first discussed those professions that seemed to perform no labor and yet demanded exorbitant remuneration, centering his attention on lawyers, physicians, theologians, masters of arts, and notaries. After these relatively respectable professions, he turned to more dubious livelihoods, e.g., those of prostitutes, actors, mimes, retail merchants, and manufacturers of doubtful wares.[23] Robert of Courson's analyses were very detailed and lengthy. His colleague Thomas of Chobham in his *Summa* (c. 1215) first attempted to deal with the moral problems peculiar to various professions in a way that could be conveniently consulted and used by the confessor. Thomas instructed the confessor, as a preliminary to the interrogation, to determine whether the penitent's vocation fell into any of four categories: those completely sinful (e.g., prostitutes and actors), those highly susceptible to sin (e.g., mongers and merchants), those that were useless (e.g., manufacturers of dice, floral wreaths, etc.), and those useful occupations that were seldom exercised faithfully (e.g., teachers and those who hired themselves out for wages). He then subjects eleven occupations to a detailed discussion. These vocations include, among others, actors, prostitutes, beggars, teachers, priests, and judges.[24] Thomas gives no indication why he chose to treat in such detail with these occupations and ignored, for example, lawyers, physicians, and soldiers. It was not until the early fourteenth century that the list of occupations singled out for special attention in the literature devoted to the confessional became stabilized to include a discussion of all those occupations whose exercise posed special problems for hamartiology. Among these the rubric *medicus*[25] appears with regularity.

The pieces of confessional literature used in the preparation of this section sometimes differ from one another significantly in length, form and emphasis. Some are short and refer the reader to no authorities for the opinions given, although they might list an abundance of sins with little or no comment. Others are longer, even very long, citing the *Decretum* and *Decretales* and numerous

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22. Gen. 3:19 - "By the sweat of your face you shall eat bread . . ." 2 Thess. 3:10 - ". . . if anyone will not work, neither let him eat."

23. Baldwin, *Masters, Princes, and Merchants*, pp. 57 ff.

24. *Summa confessorum*, ed. Broomfield, pp. 290 ff.

25. There are no separate entries for surgeons in the *summae* that I have seen. Indexed versions send the seeker after *chirurgus* to *medicus*. Some *summae* label the relevant section simply *medicus*, while others give *medicus et chirurgus* and others *medicus, phisicus et chirurgus* (with orthographical variations).

commentators (decretists on the former, decretalists on the latter)[26] to give weight to their opinions, but discuss a limited number of sins at quite great length. The order in which sins are given also differs from *summa* to *summa*. In most instances the sins mentioned are classified as mortal sins.

Practice and Competency

Several *summae* stress the responsibility on one not to practice unless he is competent. The *Astesana* (c. 1317) considers various ways in which a physician can be at fault. One is *ante factum:* ". . .when he introduces himself into the practice of medicine although he is ignorant [*cum sit idiota*]."[27] The *Angelica* (c. 1486) is similar, designating as *culpa ante factum* when a physician injects himself into a situation where he is ignorant and not able to manage it.[28] Antoninus, in his short *Confessionale* (1473), states simply that if one practices without adequate skill and has studied little or nothing, "he has sinned mortally and has exposed himself to the danger of killing men."[29] In his much longer *Summa* (1477), Antoninus elaborates that the physician must be expert in the art as expertness is defined by known experts in the art. Simply having a doctorate is not sufficient, "since many unworthy men today in every faculty are masters and doctors to the detriment of themselves and of those promoting them." When from "exceptional ignorance" they harm their patient, they sin. "Nor are they excused . . . because they did not intend to do that, because they voluntarily placed themselves in that position." Even if health should follow their ministrations they have sinned, "because they placed themselves in danger of mortal sin."[30]

Chaimis (c. 1474) maintains that if one has taken up the practice of medicine without adequate skill and if on that account has given harmful medicine or treatment to a patient, he has sinned mortally, "because it was not permitted for him to usurp what was alien to him."[31] Chaimis here refers to the authority of the papal rescript *Tua nos,* written by Innocent III in 1212, included in *Compilatio quarta*[32] and later in the *Decretales* of Gregory IX.[33] This rescript, although it is

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26. Usually the citations given are to sources dealing with principles that the summist then applies to the medical profession. I do not mention such sources. Occasionally a summist will refer to an authority who speaks directly to a medico-ethical issue. In such an instance I shall sometimes comment on the content of the source.

27. *Astesana,* 6. 14.

28. *Angelica,* sv., *Medicus,* pr.

29. Antoninus, *Confessionale,* sv., *Circa medicos.*

30. Antoninus, *Summa theologica,* pp. 281 f. References to page number of edition cited in n. 11, above.

31. Chaimis, *Interrogatorium,* sv., *Medicis, phisicis, et cirogicis.*

32. 5. 6. 3.

33. 5. 12. 19.

addressed to the peculiar problems involved in medical practice by the clergy[34] and little that pertains directly to the discussion at hand, lays down certain relevant principles and, as it is frequently cited by the summists when dealing with the medical profession, must be quoted in full:

> Your brotherhood said that we should be consulted. You asked *to be advised by the Apostolic See* what must be decided concerning a certain monk who, believing that he could cure a certain woman of a tumor of the throat, acting as a surgeon, opened the tumor with a knife. When the tumor had healed somewhat, he ordered the woman not to expose herself to the wind at all lest the wind, stealing into the incision in her throat, bring about her death. But the woman, defying his order, rashly exposed herself to the wind while gathering crops, and thus much blood flowed out through the incision in her throat, and the woman died. *She, nevertheless, confessed that she was responsible because she had exposed herself to the wind.* The question is whether this monk, since he is also a priest, may lawfully exercise his priestly office. We therefore reply to your brotherhood that, although the monk himself was very much at fault for usurping an alien function which very little suited him, nevertheless, if he did it from piety and not from cupidity, and was expert in the exercise of surgery and was zealous to employ every diligence which he ought to have done, he must not be condemned for that which happened through the fault of the woman against his advice. Then, with no penance being required, he may be permitted to celebrate divine service. Otherwise, the fulfilling of the sacerdotal office must be strictly forbidden him.[35]

We have seen that the *Astesana* (c. 1317) and the *Angelica* (c. 1486) had designated ignorance as *culpa ante factum.* Both include the categories *in facto* and *post factum* as well. The *Astesana* labels it *culpa in facto* when the physician, "although he is skilled in the art, nevertheless does not follow the traditions of the art but the fancies of his own head."[36] The *Angelica* is nearly identical, adding "or new experiments - unless they were reasonable."[37] *Culpa post factum* is described in the *Astesana* as when the physician, although skilled in the art and following procedures consistent with the traditions of the art, 'nevertheless does not apply diligence so that the patient be preserved."[38] The *Angelica* classifies as *culpa post factum* any instance where the physician is negligent about the care of a patient, citing various commentators on the rescript *Tua nos.*[39]

Antoninus, in his *Confessionale* (1473), simply says that a physician sins mortally when, having adequate skill, but owing to his notable negligence in omitting what he ought to have done, "great detriment to the patient occurs or

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34. On which see Darrel W. Amundsen, "Medieval Canon Law on Medical and Surgical Practice by the Clergy," *Bulletin of the History of Medicine* 52(1978):22-44.
35. Italicized sections, although part of the original rescript, are not included in the text as it appears in the *Decretales.*
36. *Astesana,* 6. 16. The idea that the physician sins who, instead of following the traditions of the art, follows his own inclinations and harm results, appears in several of the sources: e.g., in the *Baptistina* (c. 1480), sv., *Medicus vel cirugicus,* 5; in Bartholomaeus de Chaimis (c. 1474), *Interrogatorium,* sv., *Medicis, phisicis, et cirogicis;* and in the *Angelica* (c.1486), s.v., *Medicus,* 1.
37. *Angelica,* sv., *Medicus,* pr.
38. *Astesana,* 6. 14.
39. *Angelica,* sv., *Medicus,* pr.

could have occurred."[40] Antoninus enlarges on this in his *Summa* (1477), saying that when a physician is an expert, he sins mortally if he should commit an act of "exceptional negligence in reviewing the literature, in visiting the patient, [or] in the quality of his medical materials," if death or great aggravation of the illness results. He cites Antonius de Butrio's commentary on *Tua nos* to the effect that the physician "must employ every diligence ... following the traditions of the art; he should visit the patient and personally prescribe diet and regimen."[41] He also writes that the physician sins mortally "when he does not employ diligence in preparing medicines, unless he is definitely certain about the adroitness and honesty of the apothecaries since they sometimes put much adulterated material in them."[42] He sums up their responsibility by saying that they sin if they do not "diligently provide for those things for which provision must be made."[43]

The *Baptistina* (c. 1480) stresses that the physician ought to consult with other physicians. The physician sins mortally if, owing to his *imperitia*,[44] the patient dies or is disabled. Baptista gives the example of a patient with a broken shinbone or arm who is disabled because of the physician's *imperitia*. The physician is to be held responsible for damage. In the case of a patient with a family, the physician must make up the equivalent of lost wages for support of the man's family. "The same applies if it results from his negligence in not visiting the patient at the necessary time as he should have." This responsibility applies to anyone who "proclaims himself to be skilled by words or by a doctorate." But damages should not be imputed to one who calls himself unskilled and, owing to a dearth of good physicians, does what he can in good faith. Rather, it should be imputed "to the one who chooses such a man."[45]

Cajetan (1525) attributes some of the gravest sins of physicians to rashness: by rashly treating a disease without having adequately examined it, or by rashly exploring the nature of the disease and thus exposing the patient to the risk of death or grave injury. "If, motivated by gain or fearing that he might appear ignorant, the physician who is ignorant or negligent in study attempts to treat a case, he sins mortally."[46] He also sins by treating rashly, i.e., by neglecting either

40. Antoninus, *Confessionale,* sv., *Circa medicos.*

41. Antoninus, *Summa theologica,* p. 282. Cp. Chaimis, *Interrogatorium,* sv., *Medicis, phisicis, et cirogicis,* "If he does not apply necessary diligence about the care of the patient personally when visiting, by observing the internal signs, by regulating medicines, diet, and regimen of life, he is at fault and has sinned."

42. Antoninus, *Summa theologica,* pp. 291 f.

43. Ibid., p. 290.

44. *Imperitia* basically means inexperience and signifies the ignorance or incompetence that results from inexperience.

45. *Baptistina,* sv., *Medicus vel cirugicus,* 5. Similarly *Angelica,* sv., *Medicus,* 1, "He accuses himself who chooses one who says that he is incompetent."

46. Fumus, *Summa Armilla* (c. 1538), sv., *De medico,* 1: "... when ignorant of the ailment but from rashness or lest they be thought to be ignorant, or for the sake of gain, they undertake to treat the patient, exposing him to the danger of death, or of notable harm, this is a mortal sin."

to study or visit or to take counsel or examine the quality of the medicine if it is brought into doubt. "Or what is worse, he is ashamed to change his opinion and by his obstinancy he casts doubt on the correct cure, which he ought to follow, which was suggested by another."[47]

Fumus (c. 1538) considered as guilty of mortal sin physicians who are able to know but are not willing to study or to consult experts. "They sin mortally whenever they are acquainted with an ailment and neglect to strive for remedies or to visit, or to give the appropriate medicines if they are able, or whenever they are using one medicine and seeing that it is not effective, continue using it lest they be thought ignorant."[48]

Treatments

Six of the *summae*[49] used in this study deal with the question of whether a physician should administer a medicine if he is in doubt whether it will help or harm. All answer the question in the negative and emphasize that it is safer to leave the patient in the hands of God[50] than to expose him to the danger of the medicine.[51] Where disagreement arises among the summists is over the question of what constitutes the doubt that should deter the physician from administering the medicine. The *Pisanella* (c. 1338) states that even if he strongly (*vehementer*) believes it would be useful, if he has any doubts at all, he should not give it. Antoninus, in his *Summa* (1477), and the *Baptistina* (c. 1480) qualify the physician's doubt by classifying the medicine as one about which the physician is not certain, "following the art." Chaimis (c. 1474) writes that "in no way ought he to give it unless it is in accordance with the art from knowledge that it ought to be of help." Here he cites commentators on *Tua nos*. The *Angelica* (c. 1486) is more liberal in its advice, suggesting that if the medicine "has any probability of helping rather than harming, he thus can give it, as long as he has applied necessary diligence and attention: thus, properly (*proprie*) he is not in doubt."

Four of our *summae*[52] go on to ask whether a physician is at fault if he administers a medicine which, owing to a defect or corruption or adulteration of the materials mixed with the drug, harms the patient. All answer that the physician is not culpable if he employed the diligence that he ought in choosing the materials.

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47. Cajetan, *Summula peccatorum,* sv., *Peccata medicorum.*

48. Fumus, *Summa Armilla,* sv., *De medico,* 1.

49. *Pisanella,* sv., *Medicus vel cirurgicus;* Antoninus, *Confessionale,* sv., *Circa medicos;* Antoninus, *Summa theologica,* p. 282; *Baptistina,* sv., *Medicus vel cirugicus,* 5; *Angelica,* sv., *Medicus,* 2; Chaimis, *Interrogatorium,* sv., *Medicis, phisicis, et cirogicis.*

50. Some have "Creator;" the *Baptistina* reads, "It is safer to leave the patient to nature."

51. Here the *Baptistina* reads: ". . . than to commit him to an unskilled physician."

52. *Pisanella,* sv., *Medicus vel circurgicus; Baptistina,* sv., *Medicus vel cirugicus,* 11; *Angelica,* sv., *Medicus,* 3; Chaimis, *Interrogatorium,* sv., *Medicis, phisicis, et cirogicis.*

The attention of four of the *summae*[53] is directed to the problems peculiar to surgery. In the *Pisanella* (c. 1338) the question of a surgeon's responsibility in the event of his patient's death is raised. As long as the surgeon performing the operation or the phlebotomy was expert and exercised the necessary diligence he is not held responsible " because death is presumed to have resulted from chance [*casu*] rather than from his fault." Then these questions are raised: "What if the one who must be operated on does not have the usual arrangement of sinews and veins? Or if an unexpected and unusual fear or shaking seizes him and . . . he dies?" As long as the surgeon has not erred owing to inexperience, he has not sinned. If there is any doubt about anything, the surgeon should forgo rather than to operate. The treatment in the *Angelica* (c. 1486) is shorter but nearly identical to the above, and *Tua nos* is cited as the authority. Chaimis (c. 1474) writes that as long as the surgeon operates in accordance with the art and performs only operations that are clearly useful, he has not sinned. But if he is in doubt about the operation or about his own ability to perform it, he should refrain and dismiss the patient into God's hands without the operation. Antoninus, in his *Summa* (1477), merely stipulates that the surgeon has not sinned if his patient dies, as long as he was skilled and applied proper diligence and did not err owing to inexperience. He cites the rescript *Ad aures* as his authority.

Between 1187 and 1191 Pope Clement III had received an inquiry from a *canonicus,* who was in minor orders, who wished to be advanced to major (sacred) orders, but was concerned that his having practiced as a physician might be an impediment. Clement's reply reads:

> You have brought to our attention that, since you are skilled in the art of physic, you have diligently treated many by the medical tradition of this art, although frequently it had happened to the contrary and those, to whom you thought you were applying a remedy, after taking the medicine, incurred the danger of death. But, because you desire to be advanced to sacred orders, you wished to consult us on this. We reply to you briefly that, if your conscience troubles you on account of those things said above, in our opinion you should not advance to major orders.[54]

Although both *Ad aures* and *Tua nos* were addressed to clerics practicing, in the one case medicine, and in the other surgery, nevertheless canonists extended their principles to cover the responsibilities of secular physicians. These two rescripts are the only decretals in medieval canon law addressed specifically to the *general* responsibilities of physicians and the two are complementary. *Tua nos* contains the principle that one is obligated to refrain from usurping offices alien to him. The case in question here is a monk/priest usurping the role of surgeon — an alien role for which he was little suited as a monk/priest — but he is not

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53. *Pisanella,* sv., *Medicus vel circurgicus;* Antoninus, *Summa theologica,* p. 287; *Angelica,* sv., *Medicus,* 4; Chaimis, *Interrogatorium,* sv., *Medicis, phisicis, et cirogicis.*

54. This rescript was included in the *Compilatio secunda* (1. 8. 2) and later in the *Decretales* of Gregory IX (1. 14. 7).

held responsible, in this case, because he was expert in the exercise of surgery and had been zealous to employ all the necessary diligence. The principle is applied by commentators to anyone exercising a specialized role: one must be expert in the field and employ the necessary diligence. The concern is primarily with error of omission (either in training/experience or in diligence). *Ad aures,* on the other hand, raises the question whether the physician was responsible for harm to anyone owing to his treatments. The matter is left up to his conscience here and this particular rescript places squarely on this cleric's shoulders the onus of searching his own heart to determine whether he was responsible for any harm having come to his patients. And the concern here is with error of commission, providing the commentators (and summists as well) with a fitting balance for the issues raised by *Tua nos.*

Faithfulness

An area in which the distinction between error of omission and commission can be easily blurred is in neglecting to give the appropriate medicines. The *Pisanella* (1338) laconically states that the physician sins " if he omits medicines which he ought to have given,"[55] while the *Angelica* (1486), with equal brevity, asserts that the physician is held at fault for prolonging a patient's illness.[56] Both of these leave the question of intent open. Antoninus (1477) approaches the problem in greater depth, insisting that the physician is obligated to cure the patient as quickly as he can. "If he diligently omits a useful medicine that cures quickly so that he might leave him in his illness so as to make more money, he sins gravely and is a thief...."[57] Chaimis (c. 1474) says that the physician sins if, for any reason, he neglects to give the patient appropriate medicine. But if he "zealously aggravates an ailment in any way for the sake of making a greater profit and causes the patient to relapse, he must be punished gravely beyond a mortal sin."[58] Fumus (c. 1538) is in accord, saying that physicians sin whenever they are able to cure quickly but draw the illness out for a long time because as long as it hangs on they continue making money.[59]

We have seen above (at n. 36) that several of the summists condemn a physician for following his own fancies rather than the traditions of the art, if harm results for the patient. Inherent in the idea of following one's own fancies is the possibility of experimentation. Although experimentation is not specifically

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55. *Pisanella,* sv., *Medicus vel cirurgicus.*

56. *Angelica,* sv., *Medicus,* 1.

57. Antoninus, *Summa theologica,* p. 282. Later, in the same work, p. 292, he writes that physicians sin "when they detain the patient in his illness a long while so that they might make more money by seeing him frequently."

58. Chaimis, *Interrogatorium,* sv., *Medicis, phisicis, et cirogicis.*

59. Fumus, *Summa Armilla,* sv., *De medico,* 3.

mentioned by our earlier summists, three of our later sources include it. That these later sources, from the late fifteenth and early sixteenth centuries, specify experimentation is not surprising given the increased experimentation in medical and especially surgical circles during that period. Fumus (c. 1538) writes that physicians sin " if they supply a doubtful medicine for a certain one, or do not practice in accord with the art, but desire to practice following their own stupid fancy, or make experiments, and such like, by which the patient is exposed to grave danger."[60] Two summists are especially condemnatory of physicians experimenting on the poor: Chaimis (c. 1474) says that a physician sinned mortally "if he gave to the poor or to religious[61] or to any other whatsoever anything deceitfully or for experimentation."[62] Cajetan (1525) likewise castigates the physician who, when he has recognized the disease and knows how to treat it, "puts a poor patient in danger of life or grave injury in order to experiment with a medicine of doubtful efficacy."[63]

We have seen thus far that the summists stressed the physician's responsibility both for errors of omission and of commission in practice. There is a strong insistence that one be competent before assuming the position of physician or surgeon. Practicing without the necessary skill was considered a serious sin. The physician was held responsible for his diligence, e.g. in visiting his patients, in reviewing the literature, and for the quality of medical materials that he used. He was expected to practice in accordance with the traditions of the art, not endangering his patients by following his own fancies or experimenting or using doubtful medicines. He was also held to cure as quickly as possible and castigated for intentionally prolonging an illness for the sake of gain. Expertise, diligence, and faithfulness to the traditions of the art are absolutely expected of both physicians and surgeons by the moral theologians surveyed.

Relations with Colleagues

While all our summists have much to say on competence and diligence, only a small minority are concerned with intra- and inter-professional conduct. Both in classical antiquity and in the Middle Ages, frequent references are made to physicians' envy of and strife with one another. The writings of physicians on medical etiquette and ethics sometimes stress the importance of amicable relations among colleagues, especially in the presence of laymen. This is also a

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60. Ibid., 1.

61. A term designating those clerics living under a rule (often including a vow of poverty). They are also called regular (from *regula* - rule) to distinguish them from secular clergy (i.e., those not living under a rule).

62. Chaimis, *Interrogatorium*, sv., *Medicis, phisicis, et cirogicis.*

63. Cajetan, *Summula peccatorum*, sv., *Peccata medicorum.*

theme of university and guild regulations. It was not, however, a subject that seems to have excited the interest of the summists. Only two of our authors speak of it. Antoninus, in his *Confessionale* (1473), in his closing statement on physicians, urges the confessor to "interrogate as often as it seems best to you about the envy and slander that physicians bear against each other."[64] In his *Summa* (1477), he speaks of "their mutual envy from which they boast about cures, by being proud, and disparage their colleagues by vituperating their cures."[65] Chaimis (c. 1474) holds the physician guilty of mortal sin "if owing to envy he disparages other physicians or causes them damage." The small interest shown by the summists in physicians' mutual envy and slander does not indicate that the subject was taken lightly. Envy and slander were regarded as serious sins in the casuistic literature but as sins to which everyone is susceptible and on which everyone should be interrogated during confession. Thus they were interested in envy and slander as personal rather than professional matters. After briefly mentioning envy and slander, Chaimis goes on to make the only comment found in our summists on the physician's responsibility to abide by the codes of his professional organization: "If he has sworn to observe the statutes of his *universitas*[66] and afterwards was a violator of them, now as often as he has violated them, he has sinned mortally."[67]

Another matter about which medical guilds were concerned is the relations of physicians with apothecaries. Here again the summists take little interest, and once more only Antoninus and Chaimis comment. We have already noted (above, at n. 42) that Antoninus, in his *Summa* (1477), says that a physician sins mortally if he administers medicines made by apothecaries "unless he is definitely certain about the adroitness and honesty of the apothecaries since they sometimes put much adultered material" in their medicines. Elsewhere in the same work he writes that the physician sins mortally if he permits a dealer in spices (*aromatarius*) to use old drugs that accomplish little or nothing so that the dealer will not lose money. Here Antoninus gives the same advice we saw earlier, that a physician must not rely on an apothecary in compounding medicines, "unless he knows him to be of devout conscience and well trained and practical in such matters," but instead he ought to compound his own drugs.[68] This advice, however, is complicated by as great a moral issue, an issue that was the basis for the nearly consistent requirement in the late Middle Ages that physicians not compound their own drugs. It is the potential for serious conflict of interest that

64. Antoninus, *Confessionale*, sv., *Circa medicos*.

65. Antoninus, *Summa theologica*, p. 292.

66. *Universitas* has a different meaning from simply "university." Although it is applied to the organization of faculty, it also can be applied to corporate entities such as guilds, "universities" themselves being guilds.

67. Chaimis, *Interrogatorium*, sv., *Medicis, phisicis, et cirogicis*.

68. Antoninus, *Summa theologica*, p. 282.

arises here, with its consequent temptations, that Antoninus ignores.[69] It is not a matter that escaped the notice of Chaimis (c. 1474), who writes that if the physician had an apothecary shop and directly or indirectly compelled his patients to buy medicines from him or from another with whom he associates in practice and he did this for the sake of gain, he sinned. If on account of this the patients incurred any physical harm because they could have obtained better or more useful medicines elsewhere, or financial disadvantage because they could have obtained them for less elsewhere, the physician "is held for the price in respect to the entire loss."[70]

Fees

Our summists were, however, much more concerned with the physicians' fees and his obligations to give treatment. The problems surrounding physicians' salaries or fees are varied. In the late twelfth and early thirteenth centuries, the question of whether knowledge could be sold was discussed at great length.[71] Stephen Langton dealt with the problem of whether a master of arts who collected fees was selling spiritual knowledge and thus committing simony. He concluded "that such fees were licit. Similarly, Peter the Chanter maintained that neither physician, lawyer, nor teacher were selling the grace of God by accepting moderate salaries if they were in need."[72] Thomas Aquinas maintains that one may justly receive a fee for what one is not bound to do gratuitously, "provided that due consideration is made for the persons, the matter at hand, the labor involved, and the custom of the country." If, however, they wickedly extort an immoderate fee, they sin against justice.[73] Once it was generally agreed that members of professions could rightly receive remuneration for their services, a great debate ensued among theologians and canonists on how "just price" for services should be defined. The summists surveyed here do not contribute to such discussions, at least not when dealing with physicians' sins. Even the most theoretical of our summists, Antoninus, in his *Summa* (1477), does not become involved with previous scholastic analysis. Early in his section on physicians, he engages in an extensive analysis of the nature of medicine. During the course of his discussion he says that "a physician, because he demands and receives compensation, cannot be said to sell his knowledge or health, which are spiritual matters, but he hires out his services, and he seeks wages for his labor which was

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69. Antoninus lived in Florence, the only city to my knowledge where physicians and apothecaries were in the same guild.

70. Chaimis, *Interrogatorium,* sv., *Medicis, phisicis, et cirogicis.*

71. There is extensive secondary literature on the subject. See, in particular, Gaines Post, Kimon Giocarinis, and Richard Kay, "The Medieval Heritage of a Humanistic Ideal: *'Scientia Donum Dei Est, Unde Vendi non Potest,'* " *Traditio,* 2(1955):196-234.

72. Baldwin, *Masters, Princes, and Merchants,* 1:125.

73. Thomas Aquinas, *Summa theologica,* 2-2, 71, 4.

expended then [i.e., while rendering the service] or previously in his studying. For no one is constrained to give his service *de suo*."[74] Later, when he is ready to address the subject of physicians' remuneration, he begins by merely saying that they "can demand a salary or wage justly for their labor, as Luke 10 makes clear: 'A workman is worthy of his hire.'" He then distinguishes three different categories of physicians according to their income: 1) those paid by the community; 2) those who are not salaried but are limited by statute of the community or lord to set fees; 3) those neither salaried nor limited in anything. This first are not able to receive anything besides their salary. "If their salary is not sufficient for them, let them credit themselves with having agreed to it." The second ought not to accept more than what is specified, "unless the statue has been invalidated by opposing custom." The third "can accept and ought to demand a reasonable [*moderatum*] fee, and what is 'reasonable' is determined by the quality of care, the labor of the physician, his diligence and conscientiousness, the means of the patient, and the custom of the place."[75] Chaimis (c. 1474) simply states that the physician sinned "if he extorted an immoderate fee from the rich."[76] Fumus (c. 1538) labels as sin the action of physicians who demand an exorbitant fee "contrary to justice, or whenever they cause exceedingly excessive expenses to arise, especially from the poor, so that either they themselves or the apothecaries might make a greater profit."[77]

Three of the summists were intrigued with the question of whether a physician is obligated to treat an illness that recurs for the fee he was paid for treating it in the first instance. Antoninus (1477) considers the case where a contract had been drawn up specifying that the fee was to be paid after completion of the service. He maintains that if the illness returned to the man who was still "unwell," then the physician is obligated, "for the illness does not seem to have disappeared, nor is he fully freed who is not freed from the whole." The physician is not obligated, however, if the illness returned "after an interval of time" or if it returned "by the fault of the patient."[78] When the *Baptistina* (c. 1480) addresses the same question, the decision is based on the interval of time between the illness' disappearance and its return, unless other factors intervene. An extensive discussion is presented then involving the hypothetical case of Titius (the "John Doe" of classical and medieval Roman law) whom a physician had promised to free from gout. He seemed to have been freed but after an interval of time the gout returned. Titius then takes the physician to court on the grounds that he had not eradicated the disease but only made it inactive. Since in this case the

74. Antoninus, *Summa theologica*, p. 277.
75. Ibid., pp. 283 f.
76. Chaimis, *Interrogatorium*, sv., *Medicis, phisicis, et cirogicis*.
77. Fumus, *Summa Armilla*, sv., *De medico*, 3.
78. Antoninus, *Summa theologica*, p. 284.

physician had promised to cure him entirely, he is obligated.[79] The *Angelica* (c. 1486) presents us with Titius again, this time suffering from quartan fever. A physician agrees to free him from the disease and succeeds, but only for a brief time; the physician is held responsible because he did not extinguish the illness although he had caused the distress of the man to cease.[80]

79. *Baptistina*, sv., *Medicus vel cirugicus*, 6.

80. *Angelica*, sv., *Medicus*, 14.

Some Italian Broadsides and Passports of Epidemiologic Interest (1618-1723)*

SAUL JARCHO

IN 1980 Mr. Frederick H. Gloeckner of Philadelphia donated to the College of Physicians a group of five printed documents dealing with public health in northern Italy during the seventeenth and eighteenth centuries. Since materials of this kind provide information not only about the history of disease but also about the history of people and countries, and in addition are sometimes remarkably vivid, the new accession was welcomed warmly.

The five documents, arranged in chronological order, are as follows:

1. A broadside from Mantua dealing with plague (1618).
2. A passport or bill of health from Saltino (1657).
3. A broadside from Reggio Emilia dealing with an epizootic (1681).
4. A permit for transfer of goods from Padua (1722).
5. A permit for transfer of goods from Modena (1723).

As used in the present context the word 'broadside' has been part of the English vocabulary for more than four hundred years. An excellent definition is found in the second edition of Webster's *Unabridged*: "A sheet of paper containing one large page, or printed on one side only;—called also *broadsheet*." The two broadsides included in Mr. Gloeckner's donation, like other broadsides, were obviously designed for public display and were intended to draw attention to urgent problems.

The following translations render the originals as closely as possible, the purpose being literal rather than literary. For this reason no effort has been made to divide lengthy sentences, to mend grammar, or to improve rhetoric. This policy of editorial non-intervention allows the reader to observe the style of official Italian phraseology of the seventeenth and eighteenth centuries and municipal English of the twentieth century United States.

In a few instances either a printed word or a holograph inscription has caused difficulty. Where interpretation has been merely hazardous, the reader is warned by a bracketed question mark [?]. Where a letter or word proved illegible, ellipsis within brackets [...] has been used, the number of dots being approximately equal to the number of illegible letters. Each translation is followed by comment. At the end of the series there are some general observations.

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*Research assisted by the Zlinkoff Foundation.
Acknowledgement. The author thanks Dr. M. Lipkin and Mrs. Paul Weaver of New York, and Dr. Laura Miani of the University of Bologna, for skilled and timely assistance.

I. MANTUA, 1618

[A printed broadside, the text being 150 x 145 mm. At the top there is a coat of arms 67 x 95 mm. The two-line title is in large capital letters. The twenty-one lines of text open with an ornamented initial letter measuring 31 x 32 mm. At the end are printed the names of a magistrate and a chancellor, the latter being italicized.]

[Coat of Arms]
PROCLAMATION
ON ACCOUNT OF PLAGUE

The many eminent judges[1] and health-magistrates of this city having been informed anew by several highly respected gentlemen of certain neighboring cities that the plague is making itself felt in Durazzo, Vallona, Antiveri, Dolcigno, Scutri, and Alessio, places in Albania, with the danger that it might go on spreading to other places, therefore the same gentlemen, considering it necessary for the proper discharge of their duty that they watch with utmost care, in order by God's grace to keep away so terrible a disease, have resolved under the authorization of His Highness to put under ban from this city and its state, as by these presents they do, not only all the aforementioned places, but all of Albania itself, with all its territories, jurisdictions and surroundings, and likewise every person, animal, article of commerce, clothing, letter, vessel, and anything else that might come from the said Albania and its dependencies, or which might have passed through there or had stayed there little or long, and all this on pain of death, confiscation of the goods, loss of the clothing, animals, or merchandise, or of whatever thing might have been imported or used, either with or without a sanitary permit, contrary to the tenor of the present proclamation, under which penalty shall fall anyone who shall order, accept, give, or cause to be given shelter or lodgment to the said persons, animals, or clothing and who shall have taken part, to however small an extent, in any violation of the present proclamation, the confiscations, monetary fines or clothes or other items being given to the extent of one-third to the treasury of His Highness, another part to the accuser—this shall be kept secret if he wishes—and the remaining third part to the Health Office. From Mantua, by the Health Office, 24 July 1618.

Nobile Follenghi, judge.

Giulio Cesare Zacchi, Chancellor.

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1. *Collaterale,* a judge who assisted the mayor in his duties; see C. Battisti and G. Alessio, *Dizionario Etimologico Italiano* (Florence: Barberà, 1950-1957), p. 1011, s.v. *collaterato.*

BANDO
PER CAVSA DI PESTE.

AVISATI di nuouo li molto Illuſtri Signori Collaterale, & Conſeruatori della Sanità di queſta Città, & Stato, da diuerſi molto Illuſtri Signori di alcune Città circonuicine, che la Peſte ſi faccia ſentire in Durazzo, Vallona, Antiueri, Dolcigno, Scutri, e Aleſſio luoghi dell' Albania, con pericolo, che ſi vada tuttauia dillatando in altri luoghi; Perciò li medeſimi Signori ſtimando neceſſario per debito del loro carico d'inuigilare con ogni potere, per tenere lontano, con la gratia del Signore, coſi ſpauenteuole male: Hanno deliberato di comiſſione di S. A. di bandire, come in effetto per il preſente bandiſcono da queſta Città, & ſuo Stato, non ſolamente tutti li ſopranominati luoghi, ma tutta l'Albania medeſima, con tutti i ſuoi territorij, giuriſditioni, & circonſtanze, e parimente ogni perſona, animale, mercantia, robba, lettera, vaſſello, e qual ſi voglia coſa, che da detta Albania, & ſue pertinenze veniſſe, ò che per di là ſia paſſata, ò che poco, ò molto ne habbia toccato, e tutto ciò ſotto pena della vita, confiſcatione de' beni, perdita di robbe, animali, ò mercantie, ò coſa che s'introduceſſero, ò adoperaſſero ne con boletta di Sanità, nè ſenza contro la forma del preſente bando, nelle quali pene caderà ciaſcuno, che manderà, accettarà, darà, ò farà dar recapito, ò alloggiamento à dette perſone, animali, ò robbe, & che haverà parte ancorche minima, in alcuna tranſgreſſione del preſente bando; applicando le confiſcationi, pene pecuniarie, ò robbe, ò altra coſa, la terza parte al Fiſco di S. A. l'altra parte all' accuſatore, qual volendo ſarà tenuto ſecreto, e l'altra terza parte all'Vfficio della Sanità. Di Mantoua dall'Vfficio della Sanità li 24. Luglio 1618.

Nobile Follenghi Collaterale.

Giulio Ceſare Zacchi Cancelliero.

Fig. 1. Broadside. Mantua 1618.
150 x 145 mm.

This short text allows the reader to glimpse a surprisingly large number of aspects of Italian life. We are introduced at once to an elaborate bureaucracy, which includes judges and health-magistrates or preservers (conservatori della Sanità)*, who receive foreign information from "highly respected gentlemen" of neighboring cities. Were the latter official legates, or clandestine informers, or travelled amateurs?*

The information which they transmitted was about Albania, which lies more than 500 miles to the southeast by corvine measurement but was probably reached from Mantua by an overload journey and a voyage, which together may have taken several weeks. The inference of a voyage is strengthened by the fact that the extensive list of total exclusions includes ships coming from Albania, in addition to people, animals, goods, clothing and letters. An obvious additional inference is that each of these was considered a possible carrier of plague. It is noteworthy, further, that the penalties were severe and included death, as well as fines and confiscation. There is no mention of branding, or other mutilation, or imprisonment. The fines and confiscated items were to be divided among the exchequer, the health department, and the informer.[2] *The last-named might be protected by secrecy if he so desired.*

The text of the broadside offers no reason for doubting that the disease under discussion was plague. Two additional considerations support this diagnosis. The first is the wide prevalence of plague in Europe at this time. The eminent August Hirsch wrote as follows:[3]

> *Throughout the sixteenth century, the plague was a permanent form of disease on the continent of Europe, and that century furnishes us with a considerable number of good epidemiological records of it... During the first two-thirds of the seventeenth century we still meet with it over an equally wide area and equally often.*

To this statement we may add the more general observation that the spread of plague in Eurasia was constantly from east to west, hence news of plague in Albania warranted apprehension in Italy, especially since direct commercial contact was maintained between these two countries.

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2. For the state sharing the proceeds with other parties at law see *The Merchant of Venice*, act 4, sc. 1, lines 352-354.

3. A. Hirsch, *Handbook of Geographical and Historical Pathology,* translated by Charles Creighton (London: New Sydenham Society, 1883-1886), 1:499-500.

II. SALTINO, 1657

[An oblong slip of paper. The text measures 147 x 92 mm. The text was printed as a standard blank form, in which the gaps were later filled by holograph inscriptions in ink. In the present translation the printed words are italicized as in the original; the inscriptions are given in Roman. Below the title, the text proper is adorned by a woodcut measuring 15 x 38 mm. and placed at the left. It shows a crowned madonna holding a child.]

WE THE DEPUTIES OF THE COMMUNITY
of Saltino[4]

Testify that from this district, free (by God's grace) from all suspicion of contagious disease, there departs in order to go to Reggio Antonio Ruffelli aged 28 years, short in stature, chestnut-brown hair, beard likewise [,] and Pietro Dignatio with his tools.
Years 22 *stature* small *hair* chestnut-brown *beard* similar
Given the 28 September 1657

D[... ..] Lugnagghi, Rector

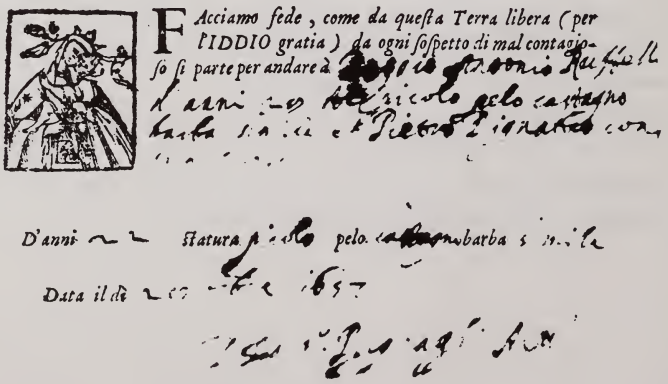

Fig. 2. Passport. Saltino, 1657.
143 x 92 mm.

4. According to Karl Baedeker, *Italy, First Part: Northern Italy,* Twelfth remodelled edition (Leipzig: 1903), p. 531, this place is about 1.5 km. from Vallombrosa. The latter is about 30 km ESE of Florence.

Since Saltino is near Florence, it can be assumed that young Messrs. Ruffelli and Dignatio, one or both of whom were artisans, were bound for Reggio Emilia and not for the much more distant Reggio Calabria. The brief document merely states that contagious disease was absent from the region of Saltino, hence the two men were permitted to depart. The obvious inference is that under other circumstances the men or their possessions might transmit disease, but the disease is not identified. The frequency of plague during the seventeenth century in Italy would place this disease high in the list of suspicion but many other communicable diseases, including influenza, are also to be considered.[5]

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III. REGGIO EMILIA 1681

[A printed text 155 x 195 mm. At the top there is a Greek cross inscribed on a shield which in turn rests on a scrolled background, the entire symbol having maximum diameters of 50 and 55 mm. The title of the broadsheet, a single word in full capitals, is followed by a two-line subtitle with initial capitals. The text proper begins with an ornamented initial letter, 15 x 15 mm.]

[Emblem]

ORDINANCE

Of the illustrious Magistracy of Health, on the occasion of the disease which is now current among animals.

The Illustrious Magistracy of Health, being always greatly concerned about matters that have reference to the general well-being, so that by God's grace it should be perfect and should be maintained thus to a fuller extent, has come to a judgment, in conjunction with the Serene Governing Prince, concerning the frequent sicknesses which arise in animals, especially in bovine animals, a matter which could cause serious harm to the health of all if the milk of the said sick animals continues to be used, turned into butter, *ricotta*,[6] or cheese, or anything else; therefore every person in the city and its duchy whatever his state or condition may be, is forbidden to dare in the future to use the said milk as long as the animals have any sign of the said sickness and as long as the said sign or sickness shall last, but they must throw it into a place where it cannot be eaten by

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5. A. Corradi, *Annali delle epidemie occorse in Italia* (Bologna: Forni, 1973), 2:183-186 and 237-239.

6. A kind of cottage cheese.

an animal of any kind, under penalty of 10 golden *scudi* for each violation, [the fine] to be given, one third to the Serene Ducal Camera, another to the Magistracy, and another third to the accuser or finder, who is to be believed if he is supported by a witness worthy of credence and it shall be kept secret, and greater fines at the judgment of the same magistrates. Owners are charged to watch that their sharecroppers carefully observe the aforementioned order. It is also necessary for the stewards of all the villas to make this ordinance known to everyone and to inform them that when any of these animals dies, they must have it buried in accordance with the proclamations already published on this subject.

And as for the animals that shall be slaughtered, whether within the city or outside it, it is incumbent on all butchers that they have the animals visited, before slaughter, by a person skilled in the [veterinary] Art, whatever the kind of animal, and this person must attest on oath and health of said animals, observing that after the slaughter if the animals shall be found by the Illustrious Judge of Provisions to have such sickness, they shall be obliged to have them buried, without having the right to sell any part of them, and in addition to the loss of said animals they shall incur other penalities according to the judgment of the same Magistracy.

Everyone is notified to obey, because violators will be prosecuted very strictly.

THE PRESIDENTS OF THE MAGISTRACY

Co[lone1?]Bonaventura Parisetti, Dr. Sig. Francesco Coltri
Captain Lodovico Signoretti. Sig. Carlo Munari

Published in Reggio at the customary assembly, on May 10, 1681.

Bortolomeo Canova, Chancell[or].

IN REGGIO, [printed] by Prospero Vedrotti,[7] 1681.

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7. Prospero Vedrotti and his father Francesco were designated official printers of the municipality of Reggio Emilia in 1648. Francesco died ca. 1670, Prospero ca. 1698. E. Manzini, "Degli stampatori reggiani...," *Atti e memorie delle RR. deputazioni de storia per le provincie dell'Emilia* (1877), pp. 135-151 (see esp. pp. 144-147). V. Ferrari, "La stampa a Reggio Emilia...," in *Tesori delle biblioteche dell'Emilia-Romagna* (Milano: Hoepli, 1932), pp. 561-592 (see esp. p. 580). For photocopied excerpts containing this information the author is indebted to Dr. Laura Miani of the Biblioteca Universitaria di Bologna.

PROVISIONE

Dell' Illuſtriſsimo Magiſtrato della Sanità, in occaſione del morbo, che di preſente corre ne Beſtiami.

INtento ſempre più L Illuſtriſſimo Magiſtrato della Sanità à quelle coſe, che riſguardano la commun ſalute [che per l' Iddio gratia] perfettiſſima ſi gode, e per mantenerla magg ormente tale, s'è venuto in parere, con participatione del Serenisſimo Signor Prencipe Gouernatore, ſtante le frequenti malatie, ch' inſo.gono ne' B.ſtiami, & principalmente nelle Beſtie Bouine, coſa che potendo apportar graue pregiuditio alla ſalute di tutti, ſe ſi ſeguitaſſe l'vſo del latte delle medeſime Beſtie morboſe; conuertito in But ro, ricotte, ò Formaggio, ò in qual ſi voglia altra coſa; Per tanto ſi proh.biſce a qualunque perſona di che ſtato, e conditione eſſer ſi voglia nella Città, e ſuo Ducato, che per l'auenire non ardiſchi di metter in opera detto Latte, purche habbino alcun legno di detta infermità, e fin che durerà detto inditio, ò malatia, mà debbano getarlo in luogo, doue non poſſ Ter mangiato da qual ſi voglia ſorted' animale ſotto pena di Scuti 10. d'oro per ciaſcuna volta, che contrafaranno, d'applicarſi per vn terzo alla Serenisſima Ducal Camera, per l'altro al Magiſtrato, & l'altro all' accuſatore, ò inuentore, al quale, col ſolo giuramento d' vn teſtimonio degno di fede, ſe li credera, e ſarà tenuto ſecreto, & altre maggiori ad arbitrio del medemo Magiſtratto; Incarricando li Patroni ad inuigilare, che li loro mezadri oſſeruino puntualmente la ſudetta Prouigione; Imponendo parimente alli Maſſari di tutte le Ville, a far ſapere à ciaſcheduno queſta loro deliberatione, coll' auiſarli, che debbano in occaſione di morte di qualched' vna d' eſſe Beſtie, farle ſeppelire in conformità delle Gride, già in tal materia publicate.

E per quelle, che ſi macelliranno, tanto in Città, quanto fuori, s' imponne à tutti li Beccari, che debbano farle viſitare prima di macellarle, da perito nell' Arte, ſijno di che ſorte di Beſtie eſſer ſi vogliano, quale à ſuo giuramento deponga la Sanità di dette Beſtie, auertendo, che doppo macellate, ſe ſaranno ritrouate dall'Illuſtriſſimo Signor Giudice delle Vettouaglie hauer tal morbo, ſaranno tenuti, farle ſeppelire, ſenza poterne vendere alcuna parte, & oltre la perdita di dette Beſtie incorrerano in altre pene ad arbitrio del medemo Magiſtrato.

Auertendo ciaſcuno ad' eſſere vbbidiente, perche ſi procederà con ogni rigore contro li tranſgreſſori.

SIGNORI PRESIDENTI DEL MAGISTRATO.

Sig. Co: Bonauentura Pariſetti Dott. | Sig. Franceſco Coltri.
Sig. Capitano Lodouico Signoretti. | Sig. Carlo Munari.

Publicata in Reggio alla ſolita Arrenghiera li 10. *Maggio* 1681.

Bortolamio Canoua Cancell.

IN REGGIO, per Proſpero Vedrotti 1681.

Fig. 3. Broadside. Reggio Emilia, 1681.
155 x 195 mm.

In the opening phrase of the proclamation the Illustrious Magistracy of Health, with the skill of a veteran bureaucracy, compliments itself on its unfailing devotion to the public health. Elsewhere in the document other officials are mentioned: the presidents of the magistracy (presumably the same magistracy of health), the Chancellor, and the illustrious Judge of Provisions who passed on the condition of slaughtered beasts. Also mentioned is a municipal assembly at which ordinances were proclaimed. On a much higher administrative plane are the Serene Ducal Camera and the Serene Governing Prince. These personages all functioned under ecclesiastical aegis, since Reggio was in the Papal States. God's grace is invoked, and this is usual during crises of epidemiologic character.[8]

In addition to higher-ups, the broadside tells of agricultural landowners, sharecroppers, stewards of villas, butchers both urban and rural, and persons "skilled in the Art"—presumably the veterinary, not the Hippocratic art. Allusion is made also to ordinances which regulate the burial of diseased animals.

In the text, which deals with an outbreak in cattle, the authorities state or imply distinct opinions on pathogenesis. The disease, it is said, could cause serious harm to the health of all—presumably to all people as well as to all animals. The disease, moreover, is transmissible through milk and the contagion is not annulled by the conversion of milk into butter, cottage cheese, or other cheese. It is transmissible to healthy animals through ingestion of their flesh (!)

Like the Mantua broadside, discussed on preceding pages, the Reggio broadside proclaims severe penalties and provides for tripartite distribution of the monetary fines. Lastly, we learn that the document was printed by Prospero Vedrotti, the official printer of Reggio. Details about him have been given above, in a footnote.

* * * * * * *

IV. PADUA, 1722

[Immediately beneath the title there is a decorative panel, 160 x 45 mm., which extends across the width of the text. It contains five parts, arranged horizontally. The largest, at the center, shows the winged lion of St. Mark atop an oval shield on which a Greek cross is inscribed. At either side of this shield there is a small angel. The four other parts of the horizontal row depict St. Anthony of Padua, two other saints, and a bishop.

The document is a printed form 160 x 125 mm containing spaces filled with holograph annotations that are printed in italics.]

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8. The word *epidemiology* is applicable only to the human component of the problem mentioned in the broadside. We need a supplementary term. Would the reader accept *epizoology?*

THE BOARD OF HEALTH OF PADUA.[9]

We affirm with unquestioned good faith that *Master Marco Castelfranco* is causing to be transported *through foreign districts* the quantities listed below, of cloth [,] merchandise, sewn work or other clothing described below, which he has brought from this city, which by divine grace is free of every slightest suspicion of contagious disease, exact information about this matter being on file, hence unhindered passage into every place can be given. In testimony whereof etc.[10]

In Padua, from the Health Office the *26th day of April, 1722* —

One bundle of silk cloths, used, and taken from this city marked $\frac{NF}{C}$ *number 18.*—

{Gio. Antonio Camposanpiero[.....] Carlo Cassale Dr. Chanc[ellor] M.

Gio: Batta Almerighi [... ..]

In Padua by Pasquati,[11] printer to the Magistracy of Health.

Fig. 4. Permit for transfer of goods. Padua, 1722.
160 x 125 mm.

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9. The title is in Latin, as are occasional phrases or formulae indicated in subsequent footnotes. Most of the text is in Italian.

10. This phrase is in Latin and reads "In quor[um] fidem &c."

11. Numerous works printed in Padua by Pasquati are listed in R.J. Durling, *A Catalogue of Sixteenth Century Printed Books in the National Library of Medicine* (Bethesda: National Library of Medicine, 1967), p. 672.

In the decorative panel at the top of the passport the lion of St. Mark attests the physical proximity, the economic and administrative subordination, and the indebtedness, of Padua to Venice.

The English title Board of Health has been used as a translation of a Latin heading, Provisores Salutis Paduae. *(The latter term carries reminiscences of the expression* anno salutis humanae, *often seen on American academic diplomas.)*

The document is a permit to export cloth, clothing, and items vaguely designated as "merchandise." These, it is stated, are to be taken out of Padua into foreign lands, which need not signify places outside Italy but could even apply to Italian localities outside the Venetian domain. Possibly the merchandise was to be taken to Venice for sale overseas.

The printed part of the text specifically mentions cloth, merchandise, sewn work, and clothing. Indeed, the form was clearly designed for articles of these categories only. The importance of this fact will be considered below.

The printed form declares, further, that exact information about contagious disease is on file. This remark is virtually a reference to an epidemiologic intelligence bureau within the Health Office or associated with it.

The brief text asserts in a general way that the city of Padua is free of contagious disease; it does not specify any individual disease. Possibly the authorities were thinking of plague, which had spread from Syria to Marseilles in 1720 and persisted until 1722. Fear of plague would explain the surveillance over movement of merchandise, which had borne the gravamen of suspicion since a time at least as early as the sixteenth century.[12]

* * * * * * *

V. MODENA, 1723

[An official form, 140 x 65 mm. The printed text contains gaps, which have been filled by holograph inscriptions printed in italics. At the sides of the heading there are symbols measuring approximately 30 x 40 mm. That on the left is blurred and shows what may be a seated ecclesiastical personage bearing a shield. A narrow border contains a partly illegible motto. The picture on the right shows a Greek cross mounted on a shield and bordered by scrolls. This symbol resembles that on the document from Reggio described above.]

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12. A. Hirsch, *op. cit.*, 1:537-538.

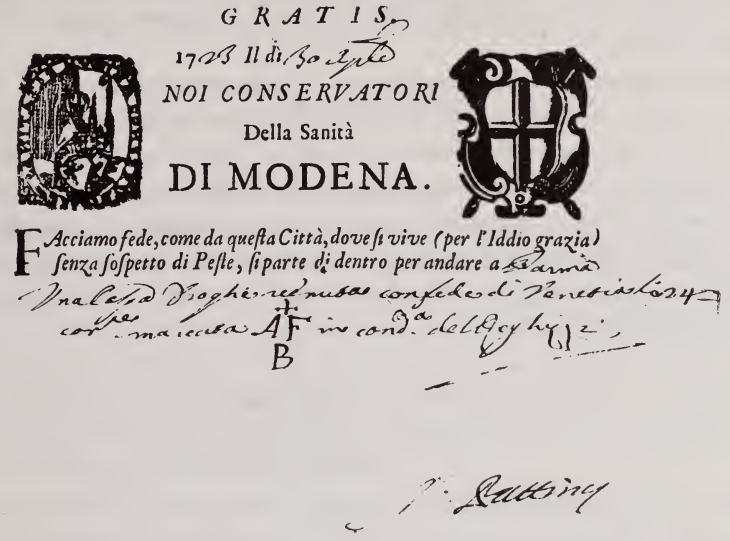

Fig. 5. Permit for shipment of drugs. Modena, 1723.
140 x 65 mm.

GRATIS
1723, the *30th of April*
WE, THE MAGISTRATES
Of Health
OF MODENA.

We affirm that from this city, where we live (by God's grace) without suspicion of plague, there may depart from within to go to *Parma a case of drugs received on trust from Venice on the 24th of this month, marked* $\overset{+}{\underset{B}{AF}}$ *in* [.. ....][13]

[.] *Dattinis* [?]

Fear of plague, implicit in the Parma passport of 1722, is overt in the passport issued by Modena one year later. A case of drugs had travelled ninety miles to Modena from Venice con fede di Venezia***—in trust, or perhaps under bond or certification. It is now permitted to go on to Parma, an additional thirty miles. The cargo had lingered six days in Modena, no reason being specified.***

13. The three final words of the Italian original appear to be *cond.*[a] [= condotta, transport] *dell eglii* [?]. The last of the three is partly covered by an illegible signature or initials. Below this, near the bottom, is the signature of [?] Dattinis.

As the Modenese document shows, the great outbreak of plague that had attacked Marseilles in 1720 and had persisted in France until 1722, was not forgotten by 1723.[14]

The five documents under review span almost seventy years of life in northern and central Italy. Obviously they cannot and do not depict the whole panorama of seven decades, nor were they intended to do so. Their revelations are incidental and fragmentary, but interesting and diverse. As we have seen, they yield bits of information about infectious disease and preventive medicine, and the facts come to us against a background of medical doctrine, social structure, civil administration, and commercial activity. Much material is presented in little space, and the harvest is gratifyingly large.[15]

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14. See also L. A. Muratori, *Relazione della peste di Marsiglia pubblicata da i medici, che hanno operato in essa...* (Moderna and Brescia: Rizzardi, 1721).

15. The Italian and other broadsides in the library of the New York Academy of Medicine are described in *J. Hist. Med.* 13 (1958): 412-413.

Some Aspects of Exorcism Within the Catholic Church in the Sixteenth and Seventeenth Centuries

CÉCILE ERNST

EXORCISM is one of the most widespread methods for treatment of psychic and somatic diseases.[1] In the present essay I shall discuss a very small section of this transhistorical and transcultural phenomenon. The evidence is derived from several well-documented exorcisms that took place during the Reformation and Counter-Reformation.[2] Nine of the exorcisms occurred in France. It will be remembered that Charcot and his disciples[3,4,5] took special interest in hysteria and in the discovery that the symptoms of possessed women were similar to those produced by hysterical patients at the Salpêtrière. This led to the publication and discussion of several historical exorcisms.

Possession and exorcism, like judicial execution, have always attracted public notice and in some cases were a popular amusement. Periodically they are noticed in the newspaper headlines even today, usually because the "possessed" has been mistreated or even killed. A few days before these lines were written, the parents and the exorcists of a young German girl were sentenced to prison. After having been subjected to exorcism for many weeks, the girl had died of exhaustion and pneumonia.

EXORCISM IN THE NEW TESTAMENT AND IN THE *RITUALE ROMANUM*

The traits of early Christian possession and exorcism are shown in one of the most impressive episodes in the New Testament, the story of the possessed Gadarene. He had "his dwelling among the tombs; and no man could bind him, no, not with chains...neither could any man tame him. And always, night and day, he was in the mountains, and in the tombs, crying and cutting himself with stones." The Gadarene ran towards Jesus and called him "Son of the most high God." Jesus threatened the "unclean Spirit" and asked for his name, which was "Legion: for we are many." When the demons had left, the possessed man was

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1. T. K. Oesterreich, *Possession, Demoniacal and Other, Among Primitive Races, in Antiquity, the Middle Ages and Modern Times* (New York, 1966).

2. Cécile Ernst, *Teufelaustreibungen. Die Praxis der katholischen Kirche im 16. und 17. Jahrhundert* (Bern, Stuttgart, Vienna, 1972).

3. Esther Fischer-Homberger, *Krankheit Frau und andere Arbeiten zur Medizingeschichte der Frau* (Bern, Stuttgart, Vienna, 1979), p. 40.

4. J. M. Charcot, P. Richer, *Les démoniaques dans l'art* (Paris, 1887).

5. P. Richer, *Etudes cliniques sur la grande hystérie ou hystéro-épilepsie* 2nd ed. (Paris, 1885), introduction by J. M. Charcot.

found "sitting, and clothed, and in his right mind."[6]

The following features of possession and exorcism are important: possession is an acute state of disordered or even self-destructive behavior, and exorcism leads to a spectacular change. Being inhabited by a supernatural spirit, the possessed has enormous strength. He also has supernatural knowledge; this enabled the Gaderene to recognize the Son of God while ordinary persons did not.

By 1614 when the Catholic Church, under the pressure of the Reformation, codified her rites in the *Rituale Romanum*, supernatural knowledge attributed to possessed persons had become more and more important. In the *Rituale*[7] the signs of possession were stated to be three: extraordinary strength; the ability to speak a language formerly unknown to the speaker; and the ability to reveal hidden events. The demon could be forced by the exorcist to reveal whether the incantations of a witch or sorcerer had caused the possession. The element of supernatural knowledge was of practical importance, since it led to the capture and torture of witches.

The authors of the *Rituale* recognized clearly that exorcisms were dramatic and sometimes amusing. They advised that the procedure take place in a church, but not before a large audience. They discouraged unnecessary questions and they did not allow the demons to make jokes. Seductive situations were prevented by a rule which provided that women who were in a state of possession and were excited must be taken care of by female attendants.

SIXTEENTH AND SEVENTEENTH CENTURY CASES

Our small collection of exorcisms[2] contains all those I could find that have been documented by protocols, wherein the events were entered daily and sometimes hourly. Usually the protocols were written by priests who were present, but in particularly important instances a public notary was employed. This was mostly the case when demons took sides in a religious controversy. Being supernatural spirits, they were believed to reveal God's will under the pressure of the exorcist's threats and prayers.

The protocols give a vivid picture of the possessed and of their treatment. We do not know, however, to what degree these well-documented examples are typical. Exorcisms must have occurred often. Itinerant exorcists went with possessed women from one place of pilgrimage to another, and pranks about possession and exorcism were very popular.[8,9] Many minor exorcisms must have

6. Mark 5. 1-20.

7. *Rituale Romanum*, tit. XI, chap. 1-3.

8. S. Garnier: *Barbe Buvée et la prétendue possession des Ursulines d'Auxonne. Etude historique et médicale d'après des manuscrits de la Bibliothèque Nationale et les archives de l'ancienne province de Bourgogne* (Paris, 1895), p. 52.

9. J. Wier, *Histoires, disputes et discours des illusions et impostures des diables, des magiciens infames, sorcières et empoisonneurs; des ensorcelez et démoniaques et de la guérison d'iceux* [French translation, 1579, of *De Praestigiis Daemonum*, 1563] (Paris: Bibliothèque diabolique, 1895), p. 613.

taken place unrecorded. Though our examples are not necessarily representative, they show the wide range of significance ascribed to exorcism in that era.

The ten exorcisms that I was able to collect refer to thirteen persons. Eleven of the subjects were young women—nuns and servants or lower-class housewives. An elderly man and a boy are the only males in the series. The behavior of the possessed fits the concept of hysteria held in Charcot's time and in our own. The subjects showed quickly changing spectacular symptoms which were reinforced and shaped by the exorcists and the audience—e.g., cramps, paralysis, states of motor excitement, "arc en cercle," and speech in an unfamiliar voice.

The extensive protocols show that many of the possessed were intelligent and energetic women who lived under stress and were totally without any socially recognized opportunity to change their situation. The morbid gain that they obtained by attracting public notice is sometimes almost ridiculously obvious to the modern reader. The protocols also report in all naiveté how difficult it was for some of the possessed to give up the state of possession before they became nuisances to the public and to the exorcists.

The following three cases illustrate some of the many aspects of exorcism.

JEANNE FÉRY, 1584-1585

The protocols of this exorcism were edited in 1886 by Bourneville, a disciple of Charcot.[10] Jeanne Féry was a former dressmaker who had entered the convent of the Black Sisters at Mons near Charleroi, in Belgium. In the spring of 1584 she was presented to the Archbishop of Mons as being possessed. During her interview she uttered doubts on some articles of faith. A commission of five priests was therefore appointed by the archbishop and charged with leading Jeanne back to the church by discussing her objections. Later her five tutors took her on a six-months' pilgrimage to different churches in the region of Mons. At each place exorcism was performed. Possession seems to have brought great variety into the monotonous life of this Black Sister.

Unfortunately the patient made little progress. The exorcists suspected that her motivation for recovery was insufficient, and she was put into a dungeon. She reacted to this sudden reversal of status and the concomitant total loss of morbid gain by entering into a state of excitement. She stopped eating, she cried and wailed for days, and she struck herself until she was covered with black bruises. She was then taken out and bound to a heavy wooden chair and lost her speech.

After four weeks of this treatment Jeanne changed her behavior. She reported that Saint Mary Magdalen had appeared to her in a vision. She went to confession. Every day she produced tokens given her by the demons as a sign of her abjuration —pieces bitten out of her flesh or consecrated wafers. During the exorcisms her

10. Bourneville, *La Possession de Jeanne Féry, religieuse professe du Couvent des Soeurs Noires de la Ville de Mons* [1584] (Paris: Bibliothèque diabolique, 1886).

demons departed, one after the other. When the last had gone, Saint Mary Magdalen appeared to the nun again and ordered that the Archbishop allow Jeanne to live at the episcopal palace for the remainder of her days.

In compliance with this order Jeanne left her convent and spent her days discussing problems of the faith with the Archbishop's attendants. Since this arrangement caused rumors, the Archbishop sent her back to the community. There she lost her speech again, refused food, vomited, and stayed up at night. After some time she was allowed to return to the palace. There she had a new vision, which led the Archbishop to give her personal instruction in the catechism.

After another month the scandal in town became so intense that Jeanne was sent back to the convent. She went away from the palace meekly; on the same day the Archbishop visited her at the Black Sisters'. As soon as Jeanne saw him, the demons possessed her again. She hit the Archbishop so hard that he was convinced of her supernatural strength and took her to the palace for the third time. There the demons left her without her having to undergo exorcism. Later Saint Mary Magdalen gave consent to Jeanne's return to the convent, under the condition, however, that her food be brought in from the episcopal kitchen and that she live in a room of her own.

At her return, Jeanne was accommodated in the common dormitory. Her possession reappeared at once. She refused food, spat out pieces of her flesh, and had to be kept under continuous surveillance. After twelve weeks of this state she summoned the Archbishop, his suite, and all the nuns to her bedside. During a kind of divine service that she improvised and directed, the devils left. Jeanne again became an ordinary member of the community of the Black Sisters, distinguished only in that she retained the Archbishop as her personal confessor.

APOLONIA GEISSLBRECHT, 1582

This exorcism was published in 1584 in Ingolstadt by two of the exorcist's attendants.[11] The possession lasted only four days. Apolonia lived at Spalt, a small town near Nuremberg. She was a farmer's wife who had married a drunkard after the death of her first husband. One evening her husband came home drunk. Not for the first time the neighbors were kept awake by a fight that lasted until morning. The next day Apolonia went to a neighbor's wife for sympathy and received a scolding. In the evening, while milking her cows in front of the house, Apolonia had a vision: she saw a tall, thin man who promised her a life with plenty of food, dancing and playing, if she would be his. She became possessed and

11. S. Agricola and G. Witmerus, *Erschröckliche, ganz wahrhafftige Geschicht welche sich mit Apolonia, Hansen Geisslbrechts Burgers zu Spalt inn dem Eystätter Bisstum Haussfrawen, so den 20. Octobris, anno 82 von dem bösen Feind gar hart besessen unnd. doch den 24. gedachts Monats widerumb durch Gottes gnädige Hilff auss solcher grossen Pein und Narter entledigt worden, verlauffen hat* (Ingolstadt, 1584).

tried to drown herself by putting her head into a puddle. The neighbors overpowered her, brought her into the house, and bound her with a chain. The following morning the Dean of Spalt visited Apolonia bringing a piece of the Holy Cross and a sacred candle. The woman reacted to these objects with increased excitement. The Dean preached to the many neighbors and to the curious bystanders on the truth of the Catholic religion (tension between Catholics and Lutherans was very high at the time). Then he left to prepare for the exorcism by fasting, praying, and a general confession.

After three days he was summoned again. Apolonia lay on the floor, bound in chains, unwashed and unkempt; some men and women were sitting on her arms and legs and were holding her body down. Yet she raved and lifted herself to the "arc en cercle." The Dean had her washed and had her dirty, bloody hair cut. In the meantime he fetched the Host and five priests to assist him. He put the sacrament on the possessed woman's head, and after much insisting and threatening, the devil confessed that this was the true body of Christ. Then the chains were removed and a surplice was wound around Apolonia's hands. In another sermon the Dean showed that the reaction of the devil proved the truth of the Catholic faith. He exorcised the demons. The patient gradually became quieter. The Dean then unwound the surplice and asked: "Dear Apolonia, how are you feeling, now?" The woman jumped up from the floor and tried to hug him. Many of the neighbors cried. Then Apolonia kissed the Dean's hands and asked for God's forgiveness. She called for her husband and asked for his forgiveness also. The spouses shook hands and cried. The Dean made her recite the Confession of Faith and Apolonia vowed a pilgrimage. Twelve months later she was reported to be in good health.

THE NUNS AT LILLE, 1613

The protocols of this exorcism that took place at the convent of Saint Brigitta at Lille in Flanders were published by the exorcist in 1623.[12] When the exorcism started, the nuns had already been possessed for years. On the second day of the rite they declared that they were possessed by the spell of a witch, a nun at their own convent, Marie de Sains.

Marie had been in odor of sanctity, but eighteen months before the onset of the possession, she had been heard to say that she was the cause of all evils. She was then put into prison as a witch and had remained there ever since without confessing additional derelictions. When she was confronted by the nuns, the demons cursed and scolded her. Marie, who had already been under continuous pressure to confess while in prison, broke down at once. She admitted having received from the devil a powder which had caused possession. She confessed to

12. I. Le Normant, *Histoire véritable et mémorable de ce qui c'est passé sous l'exorcisme de trois filles possédées en pais de Flandre. Extrait de mémoires de Messire Nicholas de Momorenci et du R. P. F. Sebastien Michaelis et du R. P. F. Francois Donsieux* (Paris, 1623).

having tried to poison the bishop and her abbess, to having killed many of the nuns, and to having crippled her own sister. As the demons continued to prompt her, she confessed to sexual intercourse with the devil and to sacrileges which the priest who prepared the protocol did not dare write down. The possessed nuns and the "witch" entered into a kind of contest for producing the most revolting fantasies. Finally they described Marie de Sains throwing her feces into the face of Christ and his mother.

Ten weeks later the possessed nuns mentioned another witch, Simone Durlet, also a former nun at their convent. Simone had been in prison for one year under suspicion of being a witch. Since she did not confess, she was set free, and she became a servant in a neighboring town. The exorcist had her arrested and brought before the possessed nuns and Marie de Sains. After six days she broke down and cried aloud that she was guilty. She gave a vivid description of the Sabbath and added details to Marie's confessions which were read to her.

Interestingly enough, the confessions of both "witches" are interspersed with attempts at retraction, which were faithfully recorded in the protocol. "You force me to say what I do not believe," Marie said to the exorcist. She remarked also that in the presence of the possessed nuns, she believed the accusations of the demons but she stopped believing them as soon as she was led away. When the exorcist urged Simone to confess, she said, "I dare not say no, but when I say yes, everything seems a dream." The possessed also wavered in their persuasion. One of the three nuns said: "How can you believe that the devils speak within me? How can you persuade me that I am possessed? We express the promptings of our imagination, we tell our fancies, even on the Sabbath."

In this case the exorcism was put completely in the service of witch-hunting and amounted to brain-washing of the accused. The exceptional state of the possessed nuns had already lasted for years. From the course of this exorcism as well as of others in the collection, one may infer that longlasting possessions were apt to change into rôle-playing or even simulation, interrupted sometimes by intervals during which the subject would attempt to report his or her true state of mind.[13,14,15]

To keep up the symptoms of acute hysteria for years on end is very strenuous. The affective tension is bound to decrease at some time. Yet the possessed, particularly when they had become witch-hunters, were forced to continue their role. It is typical of these cases of chronic possession that the protocols do not report a successful and final exorcism. Perhaps the possessed nuns were used on and off for witch-hunting.

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13. Anonymous, *Histoire de Magdelaine Bavent, religieuse de monastère St. Louis de Louviers, avec sa confession générale et testamentaire* (Paris, 1693), p. 168.

14. S. Garnier, *Barbe Buvée* (note 8), p. 71.

15. Ch. Blendec, *Cinq histoires admirables, esquelles est montré comme miraculeusement par la vertu et puissance du S. Sacrament de l'autel a esté chassé Beelzebub. Hors du corps de quatre diverses personnes...*(Paris, 1582).

DIFFERENT ASPECTS OF EXORCISM

On review of these cases, it becomes clear that possession and exorcism had several different functions for the possessed and for those who surrounded them. The *apologetic function* is apparent in the exorcism of the Gadarene: the devil is able to reveal religious truth. During the third century the demons confessed that the gods of the heathen were devils. In the fourth century they revealed that Arians were bound for hell. In the sixteenth century they demonstrated against the Calvinists that the Host was the real body of Christ. In the nineteenth century the demons propagated papal infallibility.[16] Widely publicized exorcisms of long duration are extant in which the possessed, clever or lucky enough to find a role which served the apologetic needs of the church, gained large publicity.[17] In the history of Apolonia Geisslbrecht the apologetic function of exorcism is implied, e.g., when increasing excitement was visible in the presence of the Holy Cross.

When the protocols were written, *witch-hunting* in Europe was at its climax. Denunciations flourished, especially during protracted possessions. Sometimes they were ignored, sometimes they led to torture and death, as in the well-known possession of Jeanne des Anges.[18] In addition to producing evidence that was useful in religious controversy, witch-hunting kept up public interest and provided the audience with a scapegoat for its fear and aggression. The degree of inhumanity that an exorcism might attain is apparent in the case of the three possessed nuns at Lille. It must be kept in mind, however, that it was almost impossible for the possessed to retract an accusation. This would have meant that the possession was faked and would have produced severe retaliation, the more severe the higher the public interest had been.[19]

The case of Jeanne Féry exemplifies the improvement in the position of a nun when she was possessed. Jeanne came to live at the Archbishop's residence. She obtained a room of her own and was given better food. As battlefields of God and the devil, the possessed were entitled to every attention. Sometimes they ruled the daily life and politics of a town.[20] Usually the social advantages merely lasted as long as the possession. For those possessed persons whose devils were apologists or witch-hunters, interest was easiest to maintain. Jeanne Féry was neither; on the contrary, when producing tokens she had given to the demons,

16. A. Rodewyk, *Die dämonische Besessenheit in der Sicht des Rituale Romanum* (Zürich, 1963), pp. 48-50.

17. J. Boulaeze, *Le thésor et entière histoire de la triomphante victoire du Corps du Dieu sur l'esprit malign Beelzebub, obtenu à Laon, l'an 1566* (Paris, 1578).

18. G. Legué and G. de la Tourette, *Soeur Jeanne de Agnes, Supérieure des Ursulines de Loudon (17e siècle). Autobiographie d'une hystérique possédée. D'après le manuscrit inédit de la Bibliothèque de Tours, annoté et publié par les auteurs. Avec préface de M. le Prof. Charcot* (Paris: Bibliothèque diabolique, 1886).

19. C. Ernst, *Teufelaustreibungen,* (note 2), pp. 47; 104.

20. As quoted by Tentler, ibid., p. 115.

she laid herself open to the dangerous accusation of being a witch herself.

This brings us to the question whether, as some medical historians assert, hysterical women were considered and treated as witches.[21,22] On the basis of our protocols and of our knowledge of witch trials I am inclined to say that as a general rule, acutely hysterical women were subjected to exorcism while "marginal" older women were prosecuted.[23] The wide-spread belief that the victims of the prosecution of witches were the mentally ill is questionable.

The case of Apolonia Geisslbrecht is a good example of catharsis. Her possession started in a situation of acute distress and frustration. After a few days of severe excitation, the exceptional state ended with a moving reconciliation at which many neighbors were present. Only when her personal misery had taken the shape of possession did Apolonia find sympathy and help. Being possessed gave her a socially recognized outlet for her despair. After the exorcism it was possible for her to start afresh as a kind of winner, without having lost face, and with the moral power of the church assisting her. This most successful example of psychotherapy was put at the disposal of a poor farmer's wife at a time when the mentally ill were held in chains and dreadfully neglected.

CONCLUSIONS

In possession and exorcism the needs of the individual were obliged to blend with the beliefs and needs of the church and of the times. This impact of society on possession and exorcism was an advantage as well as a liability. Persons under psychological stress were able to take up a form of behavior that had a history and an ecclesiastical tradition, and to renounce it for the greater glory of God and the Church. Sometimes they were able to gain religious and political influence and to better their social position. The possessed remained within the magical system of the time,[24] while those suffering from other kinds of mental illness were cast off. On the other hand, sensation-seeking by the audiences fostered chronic possession where continued interest was kept up by witch-hunting.

Today the church has lost her central position in society. Possession and exorcism no longer influence political and dogmatic issues. Our battles are fought on other fields. Public rewards for the possessed and public control over exorcism have disappeared as well. To an increasing degree exorcism has become an

21. G. Zilboorg, *A History of Medical Psychology* (New York, 1941), p. 144.

22. I. Veith, *Hysteria. The History of a Disease* (Chicago, London, 1965), pp. 55, 58, 65, 103.

23. C. Ernst, *Teufelaustreibungen* (note 2), p. 120.

24. E. H. Ackerknecht, "Problems of Primitive Medicine," *Bull. Hist. Med.* 11 (1942): 503-521.

activity for priests who move outside the spiritual mainstream of their church. It is also probable that the possessed today are more seriously ill and farther removed from the norms and aims of society than the possessed of four hundred years ago.

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Smut's Dark Poison: Ergot in History and Medicine

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> Shield the young Harvest from devouring blight,
> The Smut's dark poison, and the Mildew white;
> Deep-rooted Mould, and Ergot's horn uncouth,
> And break the Canker's desolating tooth.
> (Erasmus Darwin, *Botanic Garden*)

ERGOT (*Secale cornutum;* spur of the cock; horned rye; womb grain) is the dried sclerotium of *Claviceps purpurea* which develops on the ovary of *Secale cereale,* or common rye. A scourge among poor country populations, and a medicine in obstetrics and general medical practice, ergot has provided the medical historian with a wealth of information on the use and abuse of one of the more complicated drugs of the pharmacopoeia. Its application has been crowded with instances of doctors hovering on the edge of clinical facts yet, for lack of full understanding of its many—and sometimes contradictory—properties, settling uneasily on the side of empiricism and uncertain conjecture. Individual doctors, medical societies, and special examining committees have discussed, debated, prescribed, and even proscribed its use. If the diversity of opinion and application can be interpreted as a measure of importance, the history of ergot belongs in the forefront of debate for nineteenth as well as twentieth century doctors, pharmacologists, and chemists. Even the most casual review discloses conflicting opinions and statements on ergot as a medicine and a nuisance.

Ergotism

The actual cause of the ergot in the *gramineae* (grasses) was hotly debated by early naturalists, some of whom thought it was produced in rainy seasons and attributable to fog or impure atmosphere. Others believed it to be the work of worms or butterflies, while still others regarded it as the product of improper fecundation or coction of the sexual parts of the plant.[1] Added to this confusion

1. Samuel Wright, "An Experimental Inquiry Into the Physiological Action of Ergot of Rye," *Edinburgh Medical and Surgical Journal* 52 (1839): 303-06; E. N. Chapman, "Ergot; Its Natural History and Uses as a Therapeutic Agent," *Medical and Surgical Reporter,* n.s. 5 (1861): 416. For examples see Alexandre Henri Tessier, *Traité des maladies des grains* (Paris, 1783); John Friedrich Zueckert, *Abhandlung über das Mutterkorn* (Leipzig, 1786); Augustin P. DeCandolle and Jean Baptiste Lamarck, *Flore française* (Paris, 1815); Augustin P. DeCandolle, "Of the Ergot or Clavus in Corn, Known Among Farmers by the Name of the Spur. From an Essay on the Genus Sclerotium in the *Mémoires du Muséum d'histoire naturelle,* Paris," *Journal of Science and Arts,* London, 2 (1817): 272-77; Rudolph Padiera, *De secali cornuto* (Berlin, 1831); A. Zambani, *Della segala cornuta* (Padova, 1856).

was the difficulty in discerning from extant sources the symptoms that delineated the effects of eating ergotized grains. Early physicians and chroniclers employed such sobriquets as "plague" or "pestilence" to cover a diversity of infirmities, including those that doctors would later identify as anthrax, typhus, leprosy, smallpox, scurvy, and "ergotism."[2]

Not until the development of great monastic establishments which cared for the health of the common people, did observers begin to take note of the diseases (*morbis rurales*) which attacked the poor. Both in their infirmaries and in their *hospitia* (out-patient service) the monasteries treated those attacked with the disease. André Félibien (1619-1695) suggested in his *Mémoires* that the French monastic hospices gave the Church its first real experience with sufferers from ergotism. Concomitantly came the designation of patron saints, including St. Benedict of Umbria (480-543), St. Martial of Limoges, St. Geneviève of Paris, St. Martin of Tours, and the Virgin Mary. The most famous of the patron saints was St. Anthony of Egypt (251-356), whose remains had been transported to France in the eleventh century; cures were attributed to him. A hospital and brotherhood established in 1093 for the victims of ergotism led to frequent miraculous cures for the disease known as St. Anthony's Fire.[3]

Outbreaks of ergotism were common to the rye belt of continental Europe and Asia and occurred typically during periods of famine when spoiled grain was consumed. In his *Handbook of Geographical and Historical Pathology* August Hirsch recorded one hundred and thirty-two epidemics of ergotism between 591 and 1789. In France the barren districts of Sologne and Dauphiné, which were frequently subject to flooding, suffered from continuous outbreaks, as did Artois, Lorraine, and the Limousin. Ergotism also reached sections of Spain, the Netherlands, Germany, Sweden, the cantons of Switzerland, Majorca, Italy, Poland, and central Russia, where outbreaks continued until 1926. Hirsch reported only three epidemics in the British Isles. As for the United States, he noted one occurrence at a New York prison in 1825, but earlier evidence suggests that during the American War for Independence, soldiers stationed in upper New York sickened on ergotted flour from Ohio.[4]

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2. Gordon Sharp, "A Short History of Ergot," *Medical Magazine* 20 (1911): 632-33; George Barger, *Ergot and Ergotism* (London, 1931), p. 2.

3. Sharp, "A Short History of Ergot," p. 634. See also J. G. Fuller, *The Day of St. Anthony's Fire* (New York, 1968); André Félibien, *Mémoires* (Paris, 1874); St. Gregorius of Tours, *History of the Franks* (New York, 1916); Augustin Calmet, *Histoire ecclésiastique et civile de Lorraine* (4 vols.; Nancy, 1728).

4. August Hirsch, *Handbook of Geographical and Historical Pathology* (3 vols.; London, 1883-1886), 2: 211; Erwin H. Ackerknecht, *History and Geography of the Most Important Diseases* (New York, 1965), p. 140; (Anon.), "The History of Ergot," *Nature* 129 (1932): 335; Etienne Evetzky, "The Physiological and Therapeutical Action of Ergot," *New York Medical Journal and Obstetrical Review* 34 (1881): 118.

Europeans divided the miseries which attended the consumption of ergot into two classes: (1) convulsive, spasmodic, or nervous ergotism, an affection of the central nervous system characterized by areas of degeneration in the spinal cord, and (2) gangrenous ergotism, whose symptoms were due to the effect of ergot on the blood vessels and loss of blood supply to the extremities. Convulsive ergotism, sometimes known as "creeping sickness," was most common in Germany. Early German accounts mentioned tingling and symptoms of mortification in the fingers and toes, with occasional extension to the rest of the body, also vomiting, diarrhea, intense hunger, anxiety, unrest, headache, vertigo, noises in the ear, stupor, and insomnia. Often the limbs became stiff; this was accompanied by convulsive contractions of the muscles which led to staggering and awkward movements, often aggravated by mere touch. The effects lasted from one to two months. Although many victims recovered, symptoms sometimes remained for long periods, leaving permanent stiffness of the joints, muscular weakness, optic disorders, and occasional imbecility.[5] In studies carried out in the 1930s, Ralph Stockman was able to demonstrate that convulsive ergotism was "caused by poisons (phytates) normally present in rye and other grains" which, unless broken down in the bowel, were absorbed, creating lesions in the nervous system.[6]

Gangrenous ergotism, called hidden fire, St. Anthony's fire, saint's fire, evil fire, devil's fire, and holy fire, was the type common in the French countryside as well as in poor orphanages, prisons, and hospitals. Early nineteenth-century accounts mentioned headache, dizziness, nausea, vomiting, diarrhea, followed by cutaneous irritation, coldness of the limbs (due to vasospasm), with spreading erysipelatous redness. The epidermis was raised by serous exudation and the surface assumed the appearance of gangrene, the extremities becoming withered, blackened, and sphacelated. Usually the gangrene was dry but the moist variety was not altogether unknown. The patient suffered from continued low fever and phthisical symptoms, and faced eventual death from exhaustion or septicemia. Matthias Grünewald's Isenheim Altarpiece, which was commissioned between 1508 and 1516 at the Antonite monastery at Isenheim and is currently displayed in the Museé d'Unterlinden in Colmar, stands as testimony to the outbreak of St.

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5. (Editorial Remarks), *Medical Repository*, n.s. 5 (1820): 22; Evetzky, "The Physiological and Therapeutical Action of Ergot," pp. 372-73; A. K. Gardner, "An Essay on Ergot, With New Views of Its Therapeutic Action," *New York Journal of Medicine* 11 (1853): 210. For descriptive accounts see Johann G. Leidenfrost, *De morbo convulsivo epidemico Germanorum caritatis annonae comite vulgo die Kriebel-Krankheit annorum 1770 et 1771* (Leipzig, 1775); Georg W. Wedel and J. Wolf, *De morbo spasmodico maligno in Saxonia, Lusatia, vicinisque locis grassato, et adhuc grassante* (Jena, 1717); A. A. Wagner, *De convulsione cereali adnexa morbi historia* (Berlin, 1833); Godefredus G. Davidis, *De morbo convulsivo, epidemico Germanorum* (Duisburg, 1771).

6. Ralph Stockman, "The Cause of Convulsive Ergotism," *Journal of Hygiene* 34 (1934): 241.

Anthony's Fire in France and the gruesome effects on those afflicted.[7]

The research of Mellanby and of Barger in the 1930s suggested that the distribution of convulsive and gangrenous ergotism was the result of peculiarities in diet, specifically the presence or absence of vitamin A. Barger noted that the 1770 epidemic of gangrenous ergotism in Sologne and of convulsive ergotism in Hanover exemplified this effect. Sologne, on the left bank of the Rhine, was a dairy district which abounded in milk and butter. Hanover, on the right bank, was unable to sustain a dairy economy. In spite of the affinity of the districts to each other, the striking difference in the effects of ergot had caused both Barger and Mellanby to speculate on causation. Mellanby was able to duplicate the Solonge—Hanover difference by feeding ergot to dogs in the presence of different levels of vitamin A. While Hirsch and others supported the belief that England's over-all exemption from ergotism was due to abundant ingestion of meat and potatoes, Barger and Mellanby suspected that England's rich diet of milk and butter had also enabled her inhabitants to remain relatively free from the convulsive effects of ingesting ergotized grain. When Barger and Mellanby's ideas were combined with the findings of Stockman, the evidence was clear. In areas rich in dairy products, "the phytase and the bowel bacteria would be able to cope with and break down the highly poisonous phytates of the grain into the comparatively innocuous inorganic phosphates, and hence, as no convulsive symptoms developed, the people continued to consume the ergotised rye until its ergotoxine action became fully developed and gangrene resulted." Thus, convulsive ergotism which had been common to non-dairy areas was virtually absent in France and England, which produced only the gangrenous type.[8]

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7. Wright, "An Experimental Inquiry Into the Physiological Action of Ergot of Tye," p. 316; Hirsch, *Handbook of Geographical and Historical Pathology,* 2:215. See also A. Tardy, *De l'ergotisme* (Paris, 1858); H. Guillaud, *De l'ergotisme gangréneux* (Paris, 1856); P. H. Duvivier, *Traité philosophique des maladies épidémiques* (Paris, 1836); A. A. P. Bailly, *Sur l'érgotisme ou gangrène produite par le seigle ergoté* (Paris, 1820); P. A. Guérard, *Dissertation sur la gangrène ustilagineuse, ou gangrène de Sologne, attribuée au seigle ergoté* (Paris, 1818); Oliver Prescott, "Secale Cornutum, Or Ergot," *Medical Communications of the Massachusetts Medical Society* 3 (1822): 82; E. N. Chapman, "Ergot; Its Natural History and Uses as a Therapeutic Agent," *Medical and Surgical Reporter* 5 (1861): 419; F. W. Draper, "The Physiological and Therapeutic Relationships of Ergot of Rye," *Boston Medical and Surgical Journal* 3 (1869): 312, 340; P. Oginz, "Ergotismus gangrenosus," *American Journal of Obstetrics* 19 (1930): 657-64; W. J. Dilling and R. E. Kelley, "Gangrene Following the Use of Ergotized Rye Bread," *British Medical Journal* No. 3508 (Mar. 31, 1928): 540-42.

8. Barger, *Ergot and Ergotism,* pp. 23-26; E. E. Nelson and H. O. Calvery, "Present Status of the Ergot Question," *Physiological Reviews,* 18 (1938): 322-23; A. K. Gardner, "An Essay on Ergot. With New Views of Its Therapeutic Action," *New York Journal of Medicine,* n.s. 11 (1853): 210; quotation from Stockman, "The Cause of Convulsive Ergotism," p. 240.

Medical Use of Ergot

It is difficult to determine precisely when doctors first recognized the relation between ergotism and the potential medical (i.e., abortifacient and oxytocic) properties of ergot. In his *Story of Ergot* (1970) Frank Bové notes that while the ancient origins of ergot would probably remain uncertain, enough inferences could be drawn from Chinese, Greek, and other writings to keep speculation alive.[9] While such speculation relies primarily on stray inferences based on early medical texts and histories, statements made by Adam Lonitzer (1528-1586) in 1582, by Caspar Bauhinus (1560-1624) in 1595, by Rudolph Jacob Camerarius (1665-1721) in 1688, and by the English clergyman-botanist John Ray (1627-1705) in 1693, reported the use of ergot by midwives to increase uterine action. In 1660, ergot entered the pharmacopoeia when the various species of *Arundo,* the *Diapenidion* reed, and the *Junci* were recommended to expedite labor after the commencement of uterine action. They were later discarded on the grounds of unreliability—a factor that was probably due to ignorance of the ergotized and non-ergotized nature of the grains.[10]

It is reasonable to assume that seventeenth century German and French midwives employed ergot for both abortion and for childbirth and that, by the second half of the eighteenth century, ergot had become common in obstetrical practice throughout Europe; noted physicians and naturalists such as John J. Wepfer, E. G. Baldinger, and Antonine Augustin Parmentier (apothecary-in-chief at the Invalides in Paris) referred to its oxytocic property.[11] Al.-Phil. Read, who in his *Traité du seigle ergoté* (1771) noted the effects of ergotted grain and fodder on animals—that cows would drop their calves prematurely—and concluded that ergot could also facilitate labor, either for legitimate or criminal purposes. There were reports of women who gathered fresh ergot in the fields

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9. Frank J. Bové, *The Story of Ergot* (New York, 1970), pp. 136, 138; William Commons, "Ergot; Its Use and Abuse," *Transactions of the Indiana State Medical Society* 30 (1880): 67.

10. Gardner, "An Essay on Ergot, With New Views of Its Therapeutic Action," pp. 207, 229-30; Samuel Wright, "An Experimental Inquiry Into the Physiological Action of Ergot of Rye," *Edinburgh Medical and Surgical Journal* 53 (1840): 21-22; Bové, *The Story of Ergot,* p. 272. See also Christian E. Eschenbach, *Bedenken von der Schädlichkeit des Mutterkorns, und von den Mitteln zur Rettung der Ertrunkenen* (Rostock, 1771); Adam Lonitzer, *Kreuterbuch, Künstliche Conterfeytunge der Bäume, Stauden, Hecken, Kreuter, Getreyde, Gewürtze* (Frankfort, 1582); Caspar Bauhin, *L'herbier de Gaspard Bauhin déterminé par A. P. de Candolle* (Chambesy, 1904); John Ray, *Historia plantarum generalis* (3 vols.; London, 1693-1704); Rudolph J. Camerarius, *Thesium botanicum decas de plantis vernis* (Tubingen, 1688); Rudolph J. Camerarius, *De ustilagine frumenti* (Tubingen, 1709).

11. Antoine Augustin Parmentier, *Recherches sur les végétaux nourrissans* (Paris, 1781); Johan Jakob Wepfer, *Observationes medico-practicae, de affectibus capitis internis & externis* (Scaphusii, 1728); E. G. Baldinger, *Praefatio docet secale cornutum perperam a nonnullis ab infamia liberari* (Jena, 1771).

and ate large quantities of the grains in order to abort; tansy, pennyroyal, and other plants were used for the same purpose. The German word for ergotted rye, Mutterkorn or womb grain, may be an indication of this practice.[12]

From its property of expediting labor, ergotted rye became distinguished with such names as "pulvis parturiens," "pulvis partum accelerans," "poudre obstetrical," "poudre ocytocique," and "pulvis ad partum." Despite its interdiction by the French government in 1774 on grounds that it was used as an abortifacient, ergotted rye continued to find favor among physicians, who prescribed it surreptitiously. In Holland, doctors and midwives employed ergot as a secret remedy in obstetrical cases. In France, zealous supporters included the surgeon and accoucheur Jean Baptiste Desgranges of Lyons who, in 1777, advised its use to hasten dilatation of the neck of the uterus, and Madame Dupille, a midwife at Chaumont, who extolled its virtues despite government condemnation. Scottish and Dutch midwives introduced ergot into America and administered it under the title of "blasted rye tea." According to Samuel Wright, who initiated one of the early investigations into the properties of ergot, its reputation underwent an eclipse in the 1780s because of "unseasonable praises and unqualified abuse." The drug did not again receive attention in medical circles until 1807, when the American John Stearns recommended it.[13]

John Stearns and American Use of Ergot

John Stearns of Saratoga County, New York, once President of the New York State Medical Society, claimed to have first learned of *Secale cornutum* from immigrant Scottish women. Having decided to experiment with the grains, he procured a quantity of ergot from a field of rye and made a powder and a decoction.[14] After trial and error, he concluded that the decoction of ergot was much the more useful. In prescribing it, he never gave more than a dose of ten grains, and in most instances, much less. His success over a period of several years caused him to describe its effects in a letter to Dr. Samuel Akerly, physician to the New York Dispensary. In his letter, published in 1807 in the New York *Medical*

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12. Al.-Phil. Read, *Traité du seigle ergoté, dans lequel on examine les causes de cette excroissance végétale, les moyens de la prévenir, les résultats de l'analyse de ces grains, leurs effets sur les animaux, les maladies épidémiques qu'occasionne leur usage, et le traitement qu'elles exigent* (Strasbourg, 1771).

13. Jean Baptist Desgranges, "Note sur les propriétés physiques de seigle ergoté," *Journal général de médecine, de chirurgie et de pharmacie,* Paris, 109 (1829): 26-32; Wright, "An Experimental Inquiry Into the Physiological Action of Ergot of Rye," p. 22; Draper, "The Physiological and Therapeutic Relationships of Ergot of Rye," pp. 358-59; Commons, "Ergot: Its Use and Abuse," p. 64; J. M. Churchill, "Claims of the Americans to the Discovery of Ergot of Rye," *Lancet*, Oct. 24, 1829, p. 163.

14. John Stearns, "Observations on the Secale Cornutum, or Ergot; With Directions for Its Use in Parturition," *New York Medical and Physical Journal* 1 (1882): 278-79.

Repository, Stearns labeled the pulverized seeds of rye "pulvis ad partum accelerandum." This was the first public mention of the substance in American medical circles.[15]

> The prejudices which you observe exist in Europe against the use of the *Ergot*, as being actively injurious or contemptible for its inactive qualities, I know to be totally unfounded. I have administered it to more than one hundred parturient patients, and I have never given it except in cases that threatened a difficult or lingering labour. I do not recollect a single instance in which it did not ultimately succeed, and I have generally been able to predict from the commencement of its operation, with tolerable accuracy, the period of delivery.... That it is not injurious you will have some reason to believe, when I assure you that I never lost a patient that I attended during her parturition, neither immediately, nor in consequence of sickness thereby induced; and that I have never had any case where the disorder could be traced to this source.... I believe that the ergot, if properly used, will produce abortion in any case of pregnancy. I have not, however, sufficient experience to be positive on this subject.[16]

As a result of his published letter, Stearns received numerous requests for additional information from the New York, Philadelphia, and Boston areas; he responded by sending samples of the ergot and directions for its use. One early recipient of the information was Dr. Lyman Spalding of New York Hospital, who recalled having heard as a boy that farmers used ergot to "make a mare slink her foal, and the cow, her calf; and also having seen the farmer, when winnowing his rye, drive his mares and cows from this refuse part of his grain." Stearns' directions included the admonition "never to give the ergot till true pains have commenced, and dilated the os tincae [the internal uterine os] to the size of a dollar, and even then not to be given in larger doses than twenty grains; because, given prematurely, or in too large doses, the violent uterine contractions which it would produce, would be in danger of rupturing the walls of the uterus; or of destroying the child." It would appear, however, that Spalding had experimented with inert ergot, prescribing unsuccessfully nearly a quarter pound in less than twenty-four hours. He concluded that the level of effectiveness would be approximately the same with an equal quantity of coffee.[17]

Despite the problems that Spalding encountered, medical societies and journals began to popularize the use of ergot and the drug entered the *United States Pharmacopoeia* in 1820. Among the laity it became known as "hurraw medicine" because of its abortive capabilities.[18] American doctors administered

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15. Samuel Akerly, "Account of the Ergot or Spurred Rye, as Employed in Certain Cases of Difficult Parturition," *Medical Repository* 6 (1809): 342.

16. Stearns quoted in ibid., p. 344.

17. Lyman Spalding, "Letter on Ergot," *New-England Journal of Medicine and Surgery* 7 (1818): 145-48.

18. Commons, "Ergot: Its Use and Abuse," p. 64.

ergot not only for dystocia but also for the explusion of blood-clots remaining in the womb after delivery, for uterine hemorrhage, for hemoptysis, hematuria, epistaxis, hematemesis, puerperal convulsions, acute and chronic diarrhea, amenorrhea, and even erysipelas.[19] Even though physicians in France, southern Germany and Italy had long employed ergot in obstetrics, and had established rules for its use, most American physicians had the impression that the employment of spurred rye was indigenous to American practice—an original American contribution to therapeutics. This element of misguided patriotism contributed to the unquestioning manner in which the drug was employed during the early decades of the nineteenth century. During the period of his preceptorship Dr. William Commons of Union City, Indiana, knew a practitioner who "had implicit faith in its efficacy as a parturient, and gave it freely, and...had, during a long professional life, more instances of ruptured uteri, dead-born children, puerperal convulsions and widowered husbands than any other physician I have ever known."[20] Oliver Prescott, in a paper read before the Massachusetts Medical Society in 1813, presented a similarly dismal picture of his own unfortunate experiences when, misunderstanding its properties, he administered the substance before sufficient dilatation and caused the child to be crushed against the cervix. "It is therefore important, even if the pains are feeble and unfrequent," he concluded, "to delay giving this stimulating drug, until considerable dilatation has taken place, and by the respite thus gained...preserve the strength and resolution of the patient for later and more painful efforts."[21]

Having found his name connected with ergot in instances when he would have refrained from its use, Stearns went to the *New England Journal of Medicine* in 1818 and the *New York Medical and Physical Journal* in 1822 to clarify his original position. Had he anticipated abuse from fellow physicians, Stearns wrote, he would have requested legislation similar to the earlier French interdiction. All too often, "the anxious desire of many practitioners to accelerate parturition, frequently induces the premature exhibition of the ergot, and consequently the aggravated distress of the suffering patient." And many, feeling that the drug was ineffective, prescribed it "by ounces and pounds" instead of in carefully controlled draughts. "I shudder when I reflect on what might have been the situation of Dr. [Lyman] Spalding," he observed, had the substance not been inert. "A distressed patient precipitated into eternity, under circumstances the most appalling, the most afflicting to a feeling mind." Stearns argued that when

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19. Wright, "An Experimental Inquiry Into the Physiological Action of Ergot of Rye," pp. 34-35; L. Howe, "Ergot in Small and Repeated Doses," *Boston Medical and Surgical Journal* 24 (1841): 245-46; M. Antony, "Observation on Ergot," *Southern Medical and Surgical Journal* 1 (1836): 65-69.

20. Commons, "Ergot: Its Use and Abuse," p. 64.

21. Prescott, "A Dissertation on the Natural History and Medical Effects of the Secale Cornutum, or Ergot," p. 87.

properly employed, ergot injured neither mother nor child; testimonies from eminent accoucheurs who had prescribed the grain for fifteen years under proper circumstances confirmed its success. Admitting that some had denounced ergot as "highly deleterious," by causing spotted fever, dry gangrene, and accelerating labor pains too rapidly, Stearns nevertheless concluded that ergot remained "one of the most active and useful articles in the materia medica."[22]

Sterns admitted having contributed to some of the misunderstanding when he first described ergot as a nauseant which affected the uterus by sympathy and produced corresponding relaxation in the rigid fibres of the isthmus uteri. Unfortunately, physicians who subsequently experimented with the drug prescribed ergot as a substitute for bloodletting or antimony in order to relax the parturient when, in actual fact, the parturient should have been in a situation of relaxation prior to the administration of ergot. Akerly, to whom Stearns had originally transmitted his observations, had complicated matters even further by recommending ergot as a substitute for bleeding previous to and during parturition in the belief that females who were too timid to be bled, would be better served through a decoction of ergot.[23] This misunderstanding had contributed to the mistakes made by Prescott and to his subsequent condemnation of the drug. In actual fact there was no analogy between the mode of action of bleeding and that of ergot, although Stearns commented that ergot sometimes nauseated the parturient. Although physicians were pleased with the fact that bloodletting removed the resistance "produced by rigidity of the os uteri and other soft structures through which the foetus has to pass," the use of ergot only increased the contractions of the uterus, forcing the fetus violently against the cervix.[24]

In attempting to clear the air of further misunderstanding, Stearns reiterated the rules that he had previously established for the use of the drug.

1. It should never be administered where nature is competent to a safe delivery.
2. It should never be administered until the regular pains have ceased, or are ineffectual, and there is danger to be apprehended from delay.
3. It should never be administered until the rigidity of the os tincae has subsided, and perfect relaxation induced. [In such cases copious bleeding should be premised to ensure relaxation.]

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22. John Stearns, "An Answer to Dr. Spalding's Letter on Ergot," *New-England Journal of Medicine and Surgery* 7 (1818): 217-18; Stearns, "Observations on the Secale Cornutum, or Ergot; With Directions for Its Use in Parturition," pp. 280-81.

23. Akerly, "Account of the Ergot or Spurred Rye, as Employed in Certain Cases of Difficult Parturition," p. 4.

24. W. H. Richardson, "Observations on the Secale Cornutum," *Transylvania Journal of Medicine* 1 (1828): 189.

4 It should never be administered in the incipient stages of labour, nor until the os uteri is dilated to the size of a dollar.
5. It should never be administered in any preternatural presentation that will require the foetus to be turned.
6. It should never be administered during the continuance of one labour, in larger quantities than thirty grains by decoction in half a pint of water.[25]

Along with these prohibitions Stearns listed several situations in which ergot was both "necessary and important."

1. When, in lingering labours, the child has descended into the pelvis, the parts dilated and relaxed, the pains having ceased, or being too ineffectual to advance labour, there is danger to be apprehended from delay, by exhaustion of strength and vital energy from hemorrhage, or other alarming symptoms.
2. When the pains are transferred from the uterus to other parts of the body, or to the whole muscular system, producing general puerperal convulsions.
3. When in the early stages of pregnancy, abortion becomes inevitable, accompanied with profuse hemorrhage and feeble uterine contractions.
4. When the placenta is retained from a deficiency of contraction.
5. In patients liable to hemorrhage immediately after delivery.
6. When hemorrhage or lochial discharges are too profuse immediately after delivery, and the uterus continues dilated and relaxed without any ability to contract.[26]

Stearns experienced an unusually high rate of mortality in his obstetric practice. In one disaster after another his patients succumbed to puerperal fever. At length he left Albany and removed to New York City.[27]

Early Opposition

The proclamations by Stearns and other American physicians regarding the properties and uses of spurred rye did not go unnoticed by European physicians,

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25. Stearns, "An Answer to Dr. Spalding's Letter on Ergot," pp. 218-19; Stearns, "Observations on the Secale Cornutum, or Ergot; With Directions for Its Use in Parturition," pp. 281-82.

26. Stearns, "Observations on the Secale Cornutum, or Ergot; With Directions for Its Use in Parturition," pp. 284-86.

27. B. Fordyce Barker, "Report of Committee on Voluntary Communication, on the Comparative Use of Ergot and the Forceps, in Labor," *Transactions of the Medical Society of the State of New York*, 1858, p. 118.

who were disturbed to hear that the Americans claimed responsibility for the introduction of ergot into medical practice. As one British physician observed, "Jonathan, as we all know, is a creature who cannot bear too much caressing; we must not then allow him to shine in borrowed plumes."[28] Actually, Europeans had questioned the usefulness and safety of ergot for long time. Early in the seventeenth century the drug was banished from pharmacopoeias. In 1774 the French government proscribed its use, and there were difficulties both before and after ergot entered the pharmacopoeia of the London College of Physicians in 1836. In 1833, at meetings of both the London Medical Society and "of medical gentlemen belonging to Trinity College, Dublin," a majority of physicians taking part in the debate noted either the inefficiency of the drug or its "positively injurious effects."[29] Borrowing the statistical methods of Pierre Louis, St. Claire Develle blamed ergot for the increase of stillbirths in Paris, the rate having risen from 5% of the total number of births in 1829 to 9% in 1839 to 11% in 1855. By 1850 the Academy of Medicine at Paris had concluded that ergot endangered the life of the child both by compression and narcotism and adopted the position "that, except in miscarriage, in certain labors attended with hemorrhage, and occasionally at the conclusion of natural labor, parturient women would be the gainers by the complete disuse of ergot."[30]

Another factor which contributed to European displeasure was the uneven quality of the substances used in general practice. Both apothecaries and physicians lacked full understanding of the natural state of ergot, and distribution was frequently careless with little regard to proper maintenance and quality control.[31] Complicating this confusion was the fact that physicians and druggists obtained ergot from a multitude of sources (chiefly Russia, Poland, Spain, and Portugal), and fraudulent substitutes were often sold. In England, for example, sulphate of lime that had been molded and colored was sold as natural ergot; in other countries, common starch paste, colored and baked, was peddled as natural

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28. Churchill, "Claims of the Americans to the Discovery of the Ergot of Rye," p. 163.

29. W. G. Maxwell, "Contrariety of Opinions Regarding; Danger of the Same; Origin Explained; Effects of the Ergot; Its Action on the Uterus Accounted For," *India Journal of Medical and Physical Science* n.s. 2 (1837): 724-25; Evetzky, "The Physiological and Therapeutical Action of Ergot," p. 114; Barger, *Ergot and Ergotism,* p. 19; Pierre Chatard, "Experimental Observations on the Medicinal Properties of the Ergot, or Spurred Rye," *Medical Repository* n.s. 5 (1820): 11-22

30. Danyou, "Rapport sur la question: Quelle peut être l'influence du seigle ergoté sur la vie des enfants et sur la santé des mères?" *Bulletin de l'Académie de médecine,* Paris, 16 (1850-51): 6-30; D. Deville, "Recherches statistiques sur l'action du seigle ergoté dans la parturition," ibid. 24 (1858-59): 893-910; Chapman, "Ergot; Its Natural History and Uses as a Therapeutic Agent," p. 459.

31. John B. Beck, "Observations on Ergot," *Transactions of the Medical Society of the State of New York* 5 (1841): 176-76; Charles Hooker, "On the Properties and Proximate Principles of the Ergot," *Boston Medical and Surgical Journal* 10 (1834): 298-303; (A Correspondent), "Observations Upon the Properties and Proximate Principles of Ergot," *Western Medical Gazette* 2 (1834-35): 484-88.

ergot. Preparations included a saturated alcoholic tincture, wine of ergot (a tincture made with sherry wine), powder (infused in boiling water), preparations designed to be chewed, infusions, syrups, pills, and decoctions. Crude ergot and its extracts proved to be unstable, hence there was confusion as to the method of administration, and the posology. Thus the dosage ranged from three or four grains to forty and sixty grains per hour, and even up to a quarter pound![32]

Added to these difficulties was the difference of opinion over the action of the drug. The earliest physicians asserted that the effects of ergot in producing uterine contractions were due to its nauseant properties or to the efforts of the body to eliminate its poisonous presence from the blood. Some considered it depressant or sedative while other regarded it as stimulant and excitant. The Italians referred to ergot as "hyposthenic," making it an analogue of bloodletting and antimony. Some believed that it stimulated the muscular nerves of the uterus but no other nerves. Charles E. Brown-Séquard presented proof that ergot was a special stimulant of the unstriped or involuntary muscular fiber wherever found in the body.[33]

In general, European physicians remained far more skeptical than their American counterparts and preferred to use ergot only as a prophylactic against postpartum hemorrhage and as a stimulant to the non-pregnant uterus in cases of menorrhagia and metrorrhagia. But criticism emanated from America as well as Europe. David Hosack, professor of the theory and practice of physic at the University of the State of New York, was well aware of the supporting testimony given by Stearns in 1807 and later by Chapman of Philadelphia, who claimed to have used ergot in more than a hundred instances without harming either the mother or the child. In every case in which Hosack had administered the drug, however, the child was stillborn. Reflecting on his own experiences and those of his colleagues, Hosack concluded that although ergot had been called *pulvis ad*

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32. Beck, "Observations on Ergot," p. 176; Barger, *Ergot and Ergotism,* p. 216; M. Antony, "Observations on Ergot," *Southern Medical and Surgical Journal* 1 (1836): 65-66; Gardner, "An Essay on Ergot, With New Views on Its Therapeutic Action," pp. 211-12; B. Mukerji, "The Ergot Problem and the Practitioner," *Indian Medical Gazette* 73 (1938): 361; Chapman, "Ergot; Its Natural History and Uses as a Therapeutic Agent," p. 419; Draper, "The Physiological and Therapeutic Relationships of Ergot of Rye," p. 311; B. V. Christensen and J. A. Reese, "Changes in Ergot With Various Moisture Contents Under Different Conditions of Storage," *Journal of the American Pharmaceutical Association* 28 (1939): 343-60.

33. Charles E. Brown-Séquard, "Action de l'atropine et de l'ergot de seigle sur les vaisseaux sanguins," *Archives de physiologie normale et pathologique,* Paris, 3 (1870): 434; Brown-Séquard, *Experimental Researches Applied to Physiology and Pathology* (New York, 1853); Draper, "The Physiological and Therapeutic Relationships of Ergot of Rye," p. 337-38.

partum for its effects in hastening labor, a more appropriate term was *pulvis ad mortem* ("powder to bring forth death").[34]

EARLY STATISTICS

NAME	CASES	DEATHS (Stillbirths)
Hosack	3	3
Chatard	37	12
Church	7	5
Davis	10	4
T. Chavasse	18	18
Jukes	6	5
P. H. Chavasse	9	9
J. Patterson	8	3
	98	59

Other American critics included William Hall Richardson, professor of obstetrics and diseases of women and children in Transylvania University, and John B. Beck, professor of materia medica and medical jurisprudence in the College of Physicians and Surgeons of New York, who attributed the dangerous effects of ergot to "the impatience of practitioners in refusing to wait on the operations of nature." Ergot had become a convenience for the busy physician, who was anxious to do something which would save several hours of waiting. But as a time-saving agent, Beck argued, ergot was both unjustifiable and reprehensible since "nature is competent to a safe delivery, and we may rest assured that the best plan is to leave her alone to accomplish the work." The real problem was in determining when ergot was most applicable and what dangers existed for mother and fetus in that decision. To suppose, as many had, that ergot was a substitute for forceps in protracted and difficult labor and could therefore be used in any situation where forceps might be applied, created the utmost danger to the life of the infant through suffocation.[35] "It hastens labor, it is true," wrote Cyrus

34. David Hosack, "Observations on Ergot," *New York Medical and Physical Journal* 1 (1822): 206-209. Despite his opposition to ergot as a means of hastening labor, he did support its use for retention of the placenta and uterine hemorrhage. See also Evetzky, "The Physiological and Therapeutical Action of Ergot," p. 114; J. P. Walker, "An Essay on Ergot," *Lancet-Clinic* 15 (1854): 270; J. S. Dyer, "Abuse of Ergot," *Nashville Journal of Medicine and Surgery* 9 (1855): 202-204; (Committee), "Report of the Committee on Ergot," *Transactions of the Ohio State Medical Society* 13 (1858): 17-18. Statistics are from B. F. Richardson, "Observations on the Use of Ergot," *Lancet-Clinic* 13 (1852): 592.

35. Richardson, "Observations on the Secale Cornutum," pp. 175-76; Beck, "Observations on Ergot," p. 185; Hiram Holt, "On the Use of Ergot," *Boston Medical and Surgical Journal* 10 (1834): 268-69; (Anon.), "Medical Use of Ergot," ibid., p. 274.

Perkins in a letter to Beck, "but I entertain so high a respect for the intelligence of nature, that I consider this hazardous method of bringing a child *into* the world before its time, as little better than sending it *out* before its time." In far too many cases, ergot had been given under "very trivial pretexts" when it was totally unnecessary.[36]

John Brodhead Beck, whose *Essays on Infant Therapeutics* (1852) had established him among American doctors willing to question the conventional wisdom of his day, began his career in medicine by studying in the office of David Hosack. Beck later founded the *New York Medical and Physical Journal* and became president of the New York Medical Society. Influenced by the Paris clinical school and by the numerical methodology of Louis, he took issue with those who ignored the warnings that ergot was dangerous if used prior to the full dilatation of the cervix. He also noticed that the uterus assumed an entirely different mode of action under the influence of ergot and that the child advanced in a totally peculiar manner. "It is evident," he concluded, "that the child must sustain a degree of pressure entirely different from what it does in ordinary labor. In the first place, it is much greater. In the second place it is unremitting and continued, and that too for a considerable part of the time." Once under the influence of the drug, the parturient experienced no intermission of pain but a persistent contraction of the uterus. The womb hardened from the contractions and the pressure upon the child continued until the excitability of the uterus was exhausted or the child was crushed against the undilated cervix, or born asphyxiated.[37]

Europeans and Americans who condemned the use of ergot were able to report cases of lacerated cervix or ruptured perineum. There were impatient physicians who sought to hasten labor and thereby caused the deaths of both mother and child; precious moments wasted in awaiting the effects of the drug in cases of postpartum hemorrhage; sad instances of ruptured uterus where young women with healthy tissues and roomy pelves, were sacrificed needlessly, together with their unborn children. By the last decades of the nineteenth century, the administration of ergot before explusion of the placenta had been prohibited at the Rotunda Hospital in Dublin, the Edinburgh Maternity Hospital, and the chief lying-in hospitals in London—the General Lying-In, the British Lying-In, and Queen Charlotte's. As an oxytocic, ergot was excluded more and more from standard obstetric practice. Instead, physicians recommended massage to

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36. Quoted in Beck, "Observations on Ergot," p. 181. For reaction to Beck's remarks, see L. Howe, "Ergot in Small and Repeated Doses," *Boston Medical and Surgical Journal* 24 (1841): 245-49.

37. Beck, "Observations on Ergot," p. 177; John B. Beck, *Essay on Infant Therapeutics: To Which are Added Observations on Ergot; History of the Origin of the Use of Mercury in Inflammatory Complaints; Together With the Statistics of the Deaths From Poisoning in New York in the Years 1841-2-3* (New York, 1852); Chapman, "Ergot; Its Natural History and Uses as a Therapeutic Agent," p. 419.

stimulate the uterine muscles, hot carbolized vaginal injections in delayed labor and rigidity of the os, and massage to aid expulsion of the head or breech.[38]

Nevertheless, support for the spurred rye continued among zealots. One such was Harriet Garrison, M.D., who in the *Woman's Medical Journal* of 1897 identified ergot as "the safest and best oxytocic yet discovered." She asserted that ergot was crucial in "all cases" of uterine inertia where mechanical obstruction was absent, that it was "not always necessary to wait until the cervix is dilated sufficiently for the passage of the foetal head," and that ergot was "preferable to forceps in all but exceptional cases."[39]

The history of ergot in obstetrics offers a curious insight into the art and science of medicine. From their earliest applications of ergot, doctors showed confusion as to its powers and uses. Some found it an irksome drug whose multiple effects disposed them to compromise; others, less concerned with the claims of detractors, and confident that the mortality among patients was due to factors other than their own malfeasance, remained indifferent to the reformers. Not until the opponents of ergot were able to enlist the support of professional societies, medical statistics, and analyses by chemists and pharmacologists, were they able to bring restraint to the use of ergot as an oxytocic.

Other Uses of Ergot

While the use of ergot in obstetrics and gynecology encountered criticism in Europe and America—at least until ergometrine was introduced by J. C. Moir and H. W. Dudley in the 1930s—its application for other purposes fared better and enabled it to rival many of the pretensions of nostrums. Indeed, what followed the interdiction of ergot as an oxytocic was not so much a reflection of sound clinical medicine as it was the pharmacologic confusion which induced physicians to use ergot in a wide variety of diseases.

In 1877 the *United States Dispensatory* mentioned the trial use of ergot in hemoptysis, gonorrhea, dysentery, diarrhea, paraplegia, vesical and rectal paralysis or pareisis, spermatorrhea, hysteria, and intermittent fever.[40] In a paper

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38. Maxwell, "Contrariety of Opinions Regarding; Danger of the Same; Origin Explained; Effects of the Ergot; Its Action on the Uterus Accounted For," pp. 726-27; J. F. Baldwin, "The Uselessness of Ergot in Obstetric Practice," *Columbus Medical Journal* 11 (1892-93): 149-50; George J. Engelmann, "Ergot; The Use and Abuse of this Dangerous Drug," *Transactions of the American Gynecological Society* 8 (1884): 242. By the 1890s, Crede's mode of expression was adopted as an alternative to ergot in delayed placenta. See F. M. Greene, "Ergot in Labor and Abortion," *Transactions of the Kentucky Medical Society* 16 (1893): 238.

39. Harriet Garrison, "The Uses and Abuses of Ergot in Obstetrical Practice," *Woman's Medical Journal* 6 (1897): 29-32. For opposing view see Clinton Cushing, "Forceps versus Ergot," *Transactions of the California Medical Association,* 1872-73, pp. 179-82.

40. G. B. Wood and H. C. Wood, *The United States Dispensatory* (Philadelphia, 1877); Katherine Miller, "Medical Uses of Ergot," *Transactions of the Illinois State Medical Society,* 1892, p. 71.

read before the New York County Medical Association in 1903 Dr. Alfred T. Livingston recalled that, as assistant physician in the State Lunatic Asylum of Utica in the 1870s, he had employed ergot to modify the hyperemia of the brain in insanity, and especially among those of the "melancholy class." Yet another physician used ergot as a preliminary to surgical operation, since it provided tone to the walls of the blood vessels in the injured part. "When the subject can not be so prepared in advance, the administration of ergot should be made hypodermically before and during anesthesia and operation and afterward until the healing is complete."[41]

Doctors also prescribed ergot in pneumonia to "shorten the period of illness," and reduce injuries to the lungs, in the belief that ergot acted through the vasomotor nerves causing "the non-striated fibers of the capillaries to contract and the engorged lung to be depleted and relieved before tissue change and exudative results occur."[42] In Chicago and other major cities, ergot became a substitute for carbolic acid as a treatment for hemorrhoids. It was used also in the treatment of yellow fever and was injected into varicose veins. It was employed in bronchitis, whooping cough, deafness, dysentery, diabetes, cancer, cholera, coma, trichinosis, tonsilitis, asthma, and drug addiction. It was used as a dressing for wounds, as a sedative, and as a treatment for motion sickness. It was also employed as a substitute for phosphorus, nux vomica, iron, quinia, opium and the bromides in conditions of nervousness.[43] In the 1870s, physicians had reported success with ergot in cases of migraine; later studies were to confirm the validity of this treatment.[44]

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41. A. T. Livingston, "Some New and Unusual Therapeutic Applications of Ergot," *JAMA* 41 (1903): 774.

42. A. H. Agard, "Supplementary Report on Practical Medicine," *Transactions of the California Medical Association*, 1884, pp. 34-35.

43. H. T. Reynolds, "Some Uses of Ergot," *Virginia Medical Monthly* 7 (1880-81): 127; J. W. Compton, "The Therapeutic Value of Ergot," *Detroit Lancet* n.s. 2 (1879): 168; Alfred Meadows, "On the Therapeutical Uses of Ergot of Rye," *Practitioner* 1 (1868): 161-68; B. E. Hadra, "Essay on Ergot," *Richmond and Louisville Medical Journal* 20 (1875): 113-14; A. T. Livingston, "Broad Therapeutic Application of Ergot," *New York State Journal of Medicine* 2 (1902): 262-65; A. R. Smart, "Ergot—Its Physiological and Therapeutic Action," *Detroit Review of Medicine and Pharmacy* 11 (1876): 75-86; Quinton Gibbon, "The Sedative Powers of Ergot," *American Journal of the Medical Sciences*, n.s. 7 (1844): 244-45; J. L. Davis, "Sedative Properties of Ergot," *New Orleans Medical and Surgical Journal* 18 (1861): 181-83; M. O. Heydock, "The Medical Uses of Ergot, Other than as a Parturifacient," *Chicago Medical Examiner* 3 (1862): 658-62; H. F. Scott, "A Contribution to the Local Use of Ergot in Chronic Affections of the Ear, Throat, and Lungs — With Experiments and Report of Cases," *Transactions of the Medical Association of Georgia*, 1882, pp. 159-63.

44. W. G. Lennox, "The Use of Ergotamine Tartrate in Migraine," *New England Journal of Medicine* 210 (1934): 1061-65; A. H. Logan and E. V. Allen, "The Treatment of Migraine with Ergotamine Tartrate," *Proceedings of the Mayo Clinic* 9 (1934): 585-88; (Anon.), "Ergotamine Tartrate for Migraine," *Lancet* 232, pt. 1 (Mar. 27, 1937): 763; B. E. Hadra, "Essay on Ergot," *Richmond and Louisville Medical Journal* 20 (1875): 113-14; Smart, "Ergot — Its Physiological and Therapeutical Action," pp. 8-9; E. Rothlin, "Historical Development of the Ergot Therapy in Migraine," *International Archives of Allergy and Applied Immunology* 7 (1955): 205-09.

The deluge of diseases and conditions for which ergot was prescribed in the later decades of the nineteenth century reflected an attempt by physicians, pharmacologists, and chemists to discover the active ingredients of ergot and their separate effects on the body. Early chemical analyses were published by Louis Nicolas Vauquelin in 1816, by Pettenkofer in 1817 and 1826, by Wiggers who discovered ergotin in 1831, and by Bonjean in 1840. The last-named isolated oil of ergot and a substance which he called ergotine. In 1864 Wenzell isolated two ergot alkaloids, ecobolina and ergotina. In 1875, Tenret discovered a crystalline alkaloid called ergotinine. Dragendorff and Podwyssotzky postulated that ergot contained several active ingredients which had distinct and opposite properties. In 1897 Carl Jacobi differentiated the two chemical groups of ergot known as chrysotoxin and secalintoxin.[45]

In 1906 Barger and Carr isolated ergotoxine. Twelve years later, Spiro and Stoll isolated yet another alkaloid, which they called ergotamine. Because of confusion surrounding the use of ergotoxine and ergotamine, Sir Henry Dale organized a study by the Therapeutic Trials Committee of the Medical Research Council in England. Moir, who carried out the Committee's research, concluded that both drugs were reliable uterine stimulants.[46]

In 1935, Moir and Dudley annnounced the discovery of a new alkaloid, ergometrine. This active constituent was neither ergotoxine nor ergotamine but a new oxytocic substance isolated from the liquid extract of ergot which had long

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45. W. H. Cronyn and V. E. Henderson, "Ergot," *Journal of Pharmacology and Experimental Therapeutics* 1 (1909): 203-30; John C. Hemmeter, "An Experimental and Clinical Study of Ergot," *Medical News* 8 (1891): 133-39; 152-58; 264-69; 294-98; John C. Hemmeter, "A Study of Ergot. Experiments Made in the Biological Laboratory of Johns Hopkins University," *Maryland Medical Journal* 25 (1891): 287-90; Heinrich A. L. Wiggers, *Inquisito in secale cornutum respectu inprimis habito ad ejus ortum, naturam et partes constituentes, nominatium eas, quibus vires medicinales adscribendae sunt* (Gottingen, 1831); J. Bonjean, "Sur le mode de préparation et les propriétés thérapeutiques de l'ergotine," *Gazette médicale de Paris* 11 (1843): 478; Bonjean, *Practical Treatise on the Use of Ergotine* (Paris, 1861); William T. Wenzell, "Ergo Xantheim; New Active Principle Found in Ergot," *American Journal of Pharmacy* 82 (1910): 410-16; Charles Tanret, "Sur la présence d'un nouvel alcaloïde, l'ergotinine, dans le seigle ergoté," *Comptes rendus de l'Académie des sciences,* Paris, 81 (1875): 896; Tanret, "Sur les principes actifs du seigle ergoté; cornutine et ergotinine," *Bulletin général de thérapeutique médicale et chirurgicale,* Paris, 108 (1885): 224-28; Carl Jacobi, "Das Sphacelotoxin der specifisch wirksame Bestandtheil des Mutterkorns," *Archiv für experimentelle Pathologie und Pharmakologie* 39 (1897): 85-143; Georg Dragendorf, *Plant Analysis: Qualitative and Quantitative* (New York, 1888).

46. J. C. Moir, "The Alkaloids of Ergot: Ergometrine," *Pharmacy Journal* 81 (1935): 63; Moir, "Clinical Experiences With the New Alkaloid, Ergometrine," *British Medical Journal* No. 3955 (Oct. 24, 1936): 799-801; Moir, "Clinical Comparison of Ergotoxine and Ergotamine; A Report to the Therapeutic Trials Committee of the Medical Research Council," *British Medical Journal,* No. 3726 (June 4, 1932): 1022-24; W. H. Dudley, "Ergometrine," *Proceedings of the Royal Society of London* 118 (1935): 478-84; (Anon.), "Ergot in Modern Obstetrics," *Centaur* 41 (1936): 248-54; A. M. Hellman, A. C. Posner, and L. F. Ciner, "The Clinical Usefulness of Some of the Newer Ergot Alkaloids in Obstetrics," *Journal of Medicine* 19 (1938-39): 567-70.

been ignored by pharmacologists in the belief that it contained none of the known alkaloids. Isolation of the new water-soluble principle of ergot was accomplished by Davis in Chicago, Thompson in Baltimore, and Stoll and Burckhardt in Switzerland.[47] One result of this multiple discovery was a confusion of names (ergostetrine, ergotocin, ergobasine, and ergometrine). While the British Pharmacopoeia supported Sir Henry Dale's decision to keep the name ergometrine, the Council of Pharmacy and Chemistry of the American Medical Association accepted the nonproprietary name ergonovine.[48]

The most important result was the renewed use of ergot in obstetric practice. With the water-soluble ergometrine, ergot returned to the delivery room, this time with full approval of the medical profession. As Moir reported in 1974, ergometrine "is now used all over the world and probably provides the best single method of checking post-partum hemorrhage and curtailing the third stage of labor with the trickle of blood which so often occurs while the placenta is still retained."[49]

The active constituents of ergot continue to be investigated. They have played a role in the discovery of histamine, of antihistaminics, and of the hallucinogen LSD. Tomorrow, ergot constituents will no doubt provide additional solutions to the medical mysteries of today.

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47. J. C. Moir, "Ergot: From St. Anthony's Fire to the Isolation of Its Active Principle, Ergometrine (ergonovine)," *American Journal of Obstetrics and Gynecology* 120 (1974): 295; Mukerji, "The Ergot Problem and the Practitioner," p. 357; M. S. Kharasch and R. R. Legault, "The New Active Principles of Ergot," *Science* 81 (1935): 614; A. Stoll, "The New Ergot Alkaloid," *Science* 82 (1935): 415-17.

48. (Anon.), "Council on Pharmacy and Chemistry," *JAMA* 106 (1936): 1008; Mukerji, "The Ergot Problem and the Practitioner," p. 357.

49. Moir, "Ergot: From St. Anthony's Fire to the Isolation of Its Active Principle, Ergometrine (ergonovine)," p. 295.

Donald Marion Pillsbury, M.D.
1902-1980

HERMAN BEERMAN, M.D.

> "His life was gentle, and the elements so mix'd in him that Nature might stand up and say to all the World, "This was a man!"
>
> (Shakespeare)

DR. Donald Marion Pillsbury, a fellow and one time treasurer of the College of Physicians of Philadelphia, died on October 9, 1980. His passing leaves a void in the annals of dermatology, and deprives his colleagues and friends of a patient and skillful advisor, clinician, teacher, administrator and investigator. Marion B. Sulzberger, in the 1964 Donald M. Pillsbury Festschrift in the Journal of Investigative Dermatology stated:

> If I were awakened out of a sound sleep in the middle of the night and asked, 'Who among the living has contributed most to the stature of Dermatology in the United States?', I am sure that my answer would be 'Donald M. Pillsbury.' Moreover, I believe the same answer would be given by every objective person in possession of the facts.

Dr. Pillsbury was born in Omaha, Nebraska, on December 29, 1902, of fine American stock, son of Marion Albert Pillsbury and Amanda Johnson. During his high school days, Dr. Pillsbury supported his education in many ways. Among these were caddy, part-time clerk, house organ circulation manager of a life insurance company, church organist and choir director, and diener in charge of an animal surgery facility. Dr. Pillsbury in his college training already had a plan of education in advance of his time. During his medical school career he chose a then very unusual course for work toward a master's degree in a basic science laboratory, neuroanatomy. He did this between his second and third year of medicine. From 1919-1920 Dr. Pillsbury attended Creighton University in Omaha, and then the University of Omaha in 1920-1921. After attending the University of Nebraska from September, 1921 through 1923, he was awarded the B.S. degree. The same institution granted him the M.A. and M.D. degrees in 1925 and 1926, respectively. He had a two-year internship at the University of Nebraska, the last six months of which were spent in psychiatry.

In 1928, Dr. Pillsbury came to the University of Pennsylvania as a resident in dermatology and syphilology under Dr. John H. Stokes. Early in his residency Dr. Pillsbury distinguished himself. His activities represented what was to become the future of dermatology, namely research in a basic science laboratory by residents in a clinical specialty. Under the tutelage of Professor D. Wright Wilson, head of the Department of Biochemistry in the School of Medicine at the University of Pennsylvania, Dr. Pillsbury made studies on the chemistry of the skin, a field in which practically no work had been done in the United States.

Subsequently this work was continued by Dr. Pillsbury and a succession of colleagues to whom he was the preceptor. From carbohydrates in the skin, he branched out to infections, water metabolism, and vitamin deficiencies. These studies were eventually expanded from the clinical side to include investigations on the normal and abnormal bacteria flora of the human skin. His academic rise was rapid. Within ten years of his arrival at the University of Pennsylvania, Dr. Pillsbury had risen to the position of Associate Professor of Dermatology. In 1948, when he returned from the service with the rank of colonel, Dr. Pillsbury was appointed Professor of Dermatology and Chairman of the Department in the School of Medicine at the University of Pennsylvania. In 1946, he was appointed to the same positions at the Graduate School of Medicine, succeeding Dr. Fred D. Weidman during a period of reorganization of the department. He relinquished the Chairmanship of the Graduate Department in 1949, and I succeeded him.

There were three children from his first marriage to Charlotte: Mrs. Katherine Esmond Pillsbury Janeway, Donald Marion Pillsbury, Jr., and David Chamberlain Pillsbury. He is survived by these three children and his devoted wife, Susan Peebles Cooper Pillsbury.

Dr. Pillsbury's work was a big factor in the rise of dermatology in Philadelphia. He developed further an already well-established training center, and produced a facility which has attracted many students from all over the world.

Dr. Pillsbury was a proponent of the concept that only by research can dermatology advance. This idea was supported by the Rockefeller Foundation and expressed practically by a major grant to his department. His influence in promoting research in the armed forces was considerable, and he was chairman or a member of at least twenty governmental agencies. He was involved in writing the medical history of World War II. His organization of the XII International Conference of Dermatology made it an outstanding meeting. Dr. Pillsbury's publications are numerous, and his *Textbook* (Dermatology) and *Manual of Diseases of the Skin* are present-day dermatological standard works.

Dr. Pillsbury had the fortune of being able, in the course of his lifetime, to carry out a balanced career. He excelled in many facets of medical activity, including clinical practice, laboratory and clinical research, medical education, and government service. These activities were gratefully rewarded by high offices in dermatologic organizations, medals, honorary memberships, honorary degrees, and festschrifts.

A recital of the accomplishments of Dr. Pillsbury gives no real indication of the man. As one who has worked with him for over 50 years, I had opportunity to observe his whole personality. He was a gentle man, a sensitive individual with great empathy for his staff and friends; he was a devoted family man and exceedingly proud of his wife, children and grandchildren.

Dr. Pillsbury was fond of quoting the last sentence of the First Aphorism: "Not

only must the physician show himself prepared to do what is needed; he must make the patient, the attendants, and the surrounding circumstances cooperate with him." This Don did well.

Homeopathy in American History: A Commentary

JOHN B. BLAKE

BACK in the dark ages of American historiography, a graduate student named Richard Shryock told his professor that he would like to write his dissertation on the history of public health. That, the professor replied, might be interesting, but it was not history.[1] Times have changed, and the history of medicine in its broadest sense has become a favorite topic of both budding and more established American historians. Generally they consider medical history as an aspect of social history. Their primary concern is the role of medicine in, and its effect on, society, the effect of social and economic forces on the practice of medicine and medical institutions, and the role of the profession in upholding the established order. Among the more popular topics have been the various forms or systems of what I have chosen to call "irregular" practice. The term is admittedly iatrocentric, that is, it takes its standard of regularity or orthodoxy from the viewpoint of what is the dominant system of medicine in the United States today. It is, some will say, a prejudicial term. If so, I am ready to acknowledge my bias in favor of modern orthodox medicine.

In American history there have been many varieties of irregular practice: folk medicine, domestic medicine, drug-store medicine, faith healing, mesmerism, and quackery as well as more coherent systems such as Thomsonian, botanic, reformed, eclectic, hydropathic, chronothermal, osteopathic, chiropractic, naturopathic, and homeopathic medicine. I will not attempt to describe them all, but concentrate instread on the one that has received the most attention, lasted longest, and presumptively had the most influence on both the public and the orthodox profession, namely, homeopathy.

As a system, homeopathy was the creation of a German physician, Christian Friedrich Samuel Hahnemann. Born in Meissen in 1755, Hahnemann studied medicine at Leipzig, Vienna, and Erlangen, where he received his medical degree in 1779. Coming from a poor family, he had to struggle for his education and even after he began practice supported himself largely by literary hack work. During one of these projects, a translation of William Cullen's *Materia Medica* in 1790,

*Based on a paper presented in a session on "Medicine as Social History" at the meeting of the Southern Historical Association, Atlanta, Ga., November 14, 1980.

1. The story is one that Shryock often told; it has now been recorded in print: Whitfield J. Bell, "Richard H. Shryock: Life and Work of a Historian," *J. Hist. Med.* 29 (1974): 18.

Hahnemann suddenly perceived that the symptoms of the intermittent fever cured by cinchona bark were the same as those he had himself experienced from taking the bark when healthy. As one of his followers later wrote, "a ray of light penetrated his [Hahnemann's] mind, and the dawn of a new day of Medicine broke forth."[2] Thus was born the fundamental principle of homeopathy, which Hahnemann set forth more formally in 1796 in his "Essay on a New Principle for Ascertaining the Curative Power of Drugs." After noting the haphazard and ineffectual way in which physicians in the past had tried various drugs, Hahnemann urged a methodical testing and recording of the action of single drugs on healthy persons. He expected in this way to develop a materia medica with a specific remedy for every disease, on the basis of the following "axioms," first, that "Every powerful medicinal substance produces in the human body a kind of peculiar disease"; and second, "We should imitate nature, which sometimes cures a chronic disease by superadding another, and employ in the... disease we wish to cure, that medicine which is able to produce another very similar artificial disease, and the former will be cured...."[3] Hahnemann also developed the principle of using extremely minute quantities of a drug—one part in millions in doses of a drop or less. All these ideas were put together in his first major work, the *Organon of Healing,* in 1810. In subsequent years Hahnemann continued to refine and develop his system. His last important work, *On Chronic Diseases,* published in 1828, elaborated the theory that most chronic diseases resulted from a condition with cutaneous manifestations that he called "psora": when the skin eruptions only were treated, the "internal psora" remained, to reappear later as some form of chronic disease.

Since it challenged most ideas in current medicine, the *Organon* not surprisingly had a poor reception. Hahnemann was convinced, however, that he alone had the key to the truth. "Heretofore," he wrote,

> man has not treated human diseases on rational or on well established principles, but in accordance with very different therapeutic purposes, among others according to the palliative rule: contraria contariis curentur.
>
> In the opposite to this lies the truth, the true path of healing, to which I in this work give guidance: choose, in order to heal easily, quickly, and permanently, in each case of illness one drug which can call forth a similar malady, to the one you would cure (similia similibus curentur)! No one has taught this homeopathic method before.[4]

2. Constantine Hering, *A Concise View of the Rise and Progress of Homoeopathic Medicine*, tr. by Charles F. Matlack (Philadelphia: Hahnemannean Society, 1833) 7.

3. Samuel Hahnemann, *The Lesser Writings of Samuel Hahnemann,* ed. and tr. by R.E. Dudgeon (New York: William Radde, 1852) 265.

4. Hahnemann, *Organon der rationellen Heilkunde* (Dresden: Arnold, 1810) v.

Hahnemann pushed his new gospel with apostolic zeal, and in time there grew about him a band of devoted followers.[5]

Homeopathy was introduced into the United States in 1825 by Dr. Hans Burch Gram, a Bostonian of Danish extraction, who had studied medicine abroad and been converted. The chief influence, however, came from a number of German immigrants of the 1830s who settled in Pennsylvania, notably Constantine Hering. As support for homeopathy and the number of practitioners grew, schools, journals, societies, and hospitals were established. Homeopathy was especially successful among the more wealthy and educated classes in the United States, in contrast to other irregular systems. It continued to play a substantial role in the American medical scene until the present century, and a few homeopathic physicians and institutions still exist today.[6]

Despite Hahnemann's denunciation of those of his followers who ventured to differe with him as "amphibians...still creeping about in the mud of the allopathic marsh...who only rarely venture to raise their heads in freedom toward the ethereal truth,"[7] many of them did not accept his every word. In particular, the psora theory was widely ignored and there were repeated arguments over the extent to which dilution of drugs should be carried. Homeopathic physicians have generally agreed, however, on the principle of treatment by similars, the use of one drug at a time, and the use of a minimal dose. They also agreed, as did many other irregulars who agreed with them on nothing else, on opposition to bloodletting and other forms of heroic practice frequently employed by regular physicians in the first half of the nineteenth century. According to Hahnemannian theory, the homeopathic physician had to inquire minutely into the patient's symptoms and write them all down in order to select the one drug whose effects, as determined by "provings" on the healthy, most nearly matched the symptoms of the patient. This could be tedious and difficult. But, as Hering noted, whether the correct selection was made or not, "the patient will not in the least degree be incommoded with medicine, much less will injurious consequences ensue...."[8] It was to the pleasant, easy, and noninjurious nature of homeopathic therapeutics that most later critics have attributed its considerable popularity.

5. The discussion of Hahnemann is based chiefly on Richard Haehl, *Samuel Hahnemann, His Life and Work* (London: Homoeopathic Publishing Co., [1922?]) and on his own writings.

6. The progress of homeopathy in the United States may be followed in the books by Kett, Kaufman, Rothstein, and Coulter discussed below. Its decline after 1900 is also described in James G. Burrow, *Organized Medicine in the Progressive Era: the Move toward Monopoly* (Baltimore: Johns Hopkins Press, 1977) 71-82.

7. Quoted in Haehl, *Hahnemann,* p. 187.

8. Hering, *Concise View,* p. 23.

In the United States, regular physicians, at first politely skeptical, soon reacted with incredulity and then bitter hostility as homeopathy gained adherents and became a serious rival for public patronage. They found Hahnemann's theories absurd and incredible. Reasoning that no one in his right mind could believe such arrant nonsense, they concluded that homeopaths must be either knaves or fools.

The classic contemporary American analysis was that of Oliver Wendell Holmes. In his lecture on "Homoeopathy and Its Kindred Delusions" in 1842, Holmes ridiculed the extreme dilutions, the provings, and the psora theory, challenged the homeopaths' alleged therapeutic success, and predicted its rapid demise. In this he was wrong, and in 1861 he conceded that homeopathy "has taught us a lesson of the healing faculty of Nature which was needed, and for which many of us have made proper acknowledgments." Few physicians were then as generous, and the active, some might say malign, opposition of the American Medical Association continued unabated. Holmes retained his belief that homeopathy was a delusion, but he did acknowledge in 1891 that it had had a beneficial effect. The disciples of Hahnemann might still believe that their drugs cured the sick, but most people who saw patients get well under homeopathic treatment with infinitesimals concluded that they would do as well with no drugs at all. "Thus experience has shown," Holmes concluded, "that the dealers in this preposterous system of pseudotherapeutics have cooperated with the wiser class of practitioners in breaking up the system of over-dosing and over-drugging which has been one of the standing reproaches of medical practice."[9]

Six years after Holmes's death in 1894, President William McKinley helped to dedicate a statue of Hahnemann in our nation's capital. Already, however, homeopathy was undergoing a process of absorption by orthodox medicine. Its history from then on was one of steady decline until by about 1950 it seemed a subject of interest in the United States to only a tiny remnant of homeopaths and a few historians.

As homeopathy receded, medical historians seemed to be accepting a consensus not too different from Holmes's final view. Typically, Fielding H. Garrison devoted a mere half-page to homeopathy in the first edition of his comprehensive *Introduction to the History of Medicine,* published in 1913. He briefly stated the three salient principles and noted that Hahnemann's doctrines found wide acceptance, especially in America. Their "extreme popularity...," he wrote, "is probably due to the fact that they lessened the scale of dosage of drugs in practice.... Otherwise his system is but an offshoot of eighteenth century

9. O. W. Holmes, *Medical Essays, 1842-1882* (Boston: Houghton, Mifflin, 1891) x, xiii-xiv.

theorizing."[10] Other medical historians have acknowledged that some of Hahnemann's other ideas, such as his objections to polypharmacy, were of some merit in the context of his times; that his therapeutics, by doing no harm and allowing nature to take its course, may often have been better for the patient than the bloodletting and drugs prescribed by regular physicians; and that this may have helped to moderate their practice. Otherwise homeopathy is deemed to have made no contribution to the development of modern medicine and Hahnemann's theories have remained as unacceptable as they were to Holmes.[11]

Meanwhile, the history of medicine was becoming of increasing interest to historians outside the medical profession. By 1936 the negative attitude that Shryock had encountered had changed, at least at Columbia University, so that Henry B. Shafer was able to offer a Ph.D. dissertation in history on *The American Medical Profession, 1783 to 1850,* prepared under the guidance of Professor Dixon Ryan Fox, a pioneer in American social historiography. Shafer disclaimed any intention of discussing the unorthodox practitioners except "incidentally as they impinge upon the development of the regular profession."[12] His work barely mentions the sectarians, homeopathic or otherwise, and he apparently considered their influence minor. A much more important publication in 1936 was Shryock's *The Development of Modern Medicine,* a penetrating and pioneering analysis of the interaction of social and scientific factors. His analysis of homeopathy, though more extended than Garrison's, did not differ greatly from it in essentials. Its influence on therapeutics may have been beneficial, Shryock acknowledged, but its relegation from the status of a "system" to that of a "sect" was one of the best criteria for dating the advent of modern medicine, when single-theory pathology and therapeutics became unacceptable. Homeopathy

10. Fielding H. Garrison, *An Introduction to the History of Medicine* (Philadelphia: W.B. Saunders, 1913) 372.

11. Believers in homeopathy of course place a different interpretation upon history. For examples of the orthodox view, see Erwin H. Ackerknecht, *A Short History of Medicine,* rev. ed. (New York: Ronald Press, 1968) 145; Arturo Castiglioni, *A History of Medicine,* tr. by E.B. Krumbhaar (New York: Knopf, 1941) 591-592; Lester S. King, *The Medical World of the Eighteenth Century* (Chicago: University of Chicago Press, 1958) 157-191; Louis Lasagna, *The Doctors' Dilemmas* (New York: Harper, 1962) 33-35; Ralph H. Major, *A History of Medicine* (Springfield, Ill.: Charles C Thomas, 1954), 2:694-698; Cecilia C. Mettler, *History of Medicine* (Philadelphia: Blakiston, 1947) 215-216.

12. Henry B. Shafer, *The American Medical Profession 1783 to 1850* (New York: Columbia University Press. 1936) 7.

remained a relatively minor part of Shryock's total view of nineteenth century medicine, serving chiefly as a foil to set off changes in regular medicine.[13]

More recently, other social historians have been granting homeopathy a larger role. Thus Joseph Kett in 1968 described the formation of the American medical profession in antebellum America largely in terms of the contrasts and conflicts between the orthodox physicians and the principal sects, the Thomsonians and the homeopaths. Without entirely neglecting the medical aspects of their differences, he emphasized the relation of reformist ideas to the Thomsonians and the appeal of the spiritual aspect of homeopathy to New England transcendentalists and other intelligentsia. But the chief significance of homeopathy is seen as offering the orthodox physicians a caricature of themselves. This not only helped to end heroic treatment, in Kett's view, but also forced orthodoxy, especially in the Boston area, to give more attention to the uncertainty of medicine, to relinquish its own dogmas, and to undertake more scientific observation of the results of treatment. Only thus could the regular profession attack homeopathy as dogmatic and therefore sectarian. Where Shryock saw the rejection of homeopathy as resulting from the fact that medicine was quite independently becoming scientific, Kett saw the competition of homeopathy as an active agent tending to force medicine to become scientific.[14]

In 1971, Martin Kaufman gave us an entire volume devoted to the rise and fall of homeopathy in the United States. His view of regular medicine into the 1850s strongly emphasizes the extent of heroic practice—bleeding, blistering, and dosing with calomel—and he opines that homeopathy, as a system "based upon investigation and research...seemed more firmly grounded in scientific experimentation than even the orthodox practice." The regulars were undertaking more research, but it was "not directed toward developing a system of medical practice." Kaufman's account, which he brings up to the 1950s, is an interesting story of conflicts and maneuvers, but the development of medical science plays a minor role in his analysis. Although he recognizes that changes in orthodox practice had an influence, the marked decline in homeopathy between 1900 and 1920 is attributed chiefly to reforms in medical education.[15]

13. Richard H. Shryock, *The Development of Modern Medicine: an Interpretation of the Social and Scientific Factors Involved,* rev. ed. (New York: Knopf, 1947) 163-164, 248-272. See also his *Medicine and Society in America 1660-1860* (New York: New York University Press, 1960) 144-145; and his "Empiricism versus Rationalism in American Medicine 1650-1950," *Proc. Amer. Antiq. Soc.* 79 (1969): 119-121.

14. Joseph F. Kett, *The Formation of the American Medical Profession: the Role of Institutions, 1780-1860* (New Haven: Yale University Press, 1968). See especially 132-164.

15. Martin Kaufman, *Homeopathy in America: the Rise and Fall of a Medical Heresy* (Baltimore: Johns Hopkins Press, 1971). Quotation on 29.

William Rothstein in 1972 went even further in describing the development of American medicine in the nineteenth century in terms of the chief groups, Thomsonians and eclectics, homeopaths, and regulars. Rothstein considers theory unimportant, therapy all-important, not only in how the patient views his doctor but also in how medical practitioners view each other. In his analysis all these groups are equally dogmatic and sectarian (although homeopathic therapy is preferred). He devotes considerable attention not only to the "heroic" therapy of pre-Civil War America but also to the continuation of other forms of active therapy after the decline of bloodletting and calomel. "Throughout the period [following the Civil War]," he writes, "harmful drugs made the presence of the physician a dubious advantage in much medical care." Only at the end of the century, when "scientific medicine" began to produce "valid therapies," did this situation change. Rothstein largely ignores the differences that existed within regular medicine (though not those within homeopathy) even in matters of therapy or the contributions being made to fundamental medical knowledge. Consequently "scientific medicine," which is nowhere adequately defined but apparently is equated with "valid therapy"—which is equally undefined—seems to appear like a *deus ex machina* which "cast out the dogmas [regular and otherwise] and transformed medicine from sect to science."[16]

More recently the view that the regulars and all the sects are to be lumped together as equally valid cultural artifacts has been reflected in a tendency to call them "alternative healing systems,"[17] which is, of course, the currently preferred term of those who would promote so-called natural healing and various other forms of nonstandard or non-Western medicine. It is as value loaded in its own way as the denomination of homeopaths as sectarians or irregulars.

The emphasis on homeopathy as the key factor in nineteenth century American medicine reaches a high point in the recent works of Harris Coulter, a political scientist by training and medical historian by inclination, who is also a convinced believer in the superiority of homeopathy and is active as its Washington lobbyist. According to Coulter's interpretation regular medicine did not advance itself in the second half of the nineteenth century because the need

16. William G. Rothstein, *American Physicians in the Nineteenth Century: from Sects to Science* (Baltimore: Johns Hopkins University Press, 1972). Quotations from 186 and 326.

17. As in David V. McQueen, review of J. W. Leavitt and R. L. Numbers, *Sickness and Health in America,* in *Sudhoffs Archiv* 63 (1979): 407. See also his "Nordamerika als Beispiel Heilkundlicher Pluralität in einer modernen Gesellschaft," in *Krankheit, Heilkunst, Heilung,* ed. by Heinrich Schipperges et al., Veröffentlichungen des Instituts für Historische Anthropologie, Bd. 1 (Freiburg: Alber, 1978) 343-395.

for a united front in the fight against homeopathy precluded internal reform. Regular medicine eventually won out as the dominant form of practice, he claims, primarily because pure homeopathy was intellectually difficult to practice, required the physician to spend too much time with each patient, and therefore could not be as profitable. "Modern allopathic medicine is thus the antithesis of the holistic homoeopathic practice," Coulter writes. "The economic forces which shaped the one led to the decline of the other. This was the normal consequence of allowing the manner and form of medical practice to be determined entirely by the play of economic forces." It is unfortunate, in Coulter's view, that the country allowed "a single school of therapeutics" to acquire "on specious 'scientific' grounds" control over medicine. Otherwise the practice of the homeopathic physician could have served "as a continuing standard for measuring the performance of the medical profession as a whole."[18]

Coulter's tendentious purpose is obvious but the work is stimulating if only because it gives those who place more credence in orthodox medicine a chance to see themselves as another sees them. Many would agree that the popularity of Thomsonianism, homeopathy, health reform, and hydropathy in the period from about 1830 to 1860 reflected the faults of medicine at that time, just as comparable movements may reflect faults and weaknesses of medicine today. But it is also worth inquiring, I believe, whether much of the current historical interest in irregular practice among others besides Coulter is not also stimulated and their judgment colored by their own reaction against various aspects of current medicine. The complaints are often the same as Hahnemann's: polypharmacy, heroic therapy with powerful drugs causing iatrogenic disease, and insufficient attention to the individual patient as a human being.

This raises the further question as to whether the bleak view of nineteenth century American medicine that is apparently becoming the vogue among many historians has not itself been overdone. In a review essay entitled "Will Medical History Join the American Mainstream?" John C. Burnham noted recently that the "dreadful medical treatments" and "other colorful details" of nineteenth century medicine are particularly attractive to students and general readers "because today many people use the medical profession as a whole for a

18. Harris L. Coulter, *Divided Legacy: a History of the Schism in Medical Thought. Volume III. Science and Ethics in American Medicine: 1800-1914* (Washington: McGrath Publishing Co., 1973). Quotation on 453-454. See also his *Homoeopathic Medicine* (Washington: American Foundation for Homoeopathy, 1972) and his *Homoeopathic Influences in Nineteenth-Century Allopathic Therapeutics: a Historical and Philosophical Study* (Washington: American Institute of Homeopathy, 1973).

scapegoat." He pleads for a more comprehensive and less naive view of medical history but still one that emphasizes the role of the profession in society rather than the "internalist" history of medical science and therapeutics, which he blames for many of medicine's present difficulties.[19] In the hands of competent historians who are sensitive to medical aspects of their subjects, this approach has led to valuable contributions broadening our understanding of the development of medicine. But the social historians' approach can be just as one-sided as the technical medical history that is written by many physicians and criticized so freely by some historians. As J. E. Dezeimeris noted in 1838, "To write only the internal history [of medicine] would mean writing the complete history of the science, but a history without life, a body without soul. To limit oneself to the external history would mean not to say even the first word about the real history of the science...."[20]

Therapeutic innovations such as the use of aspiration in thoracentesis for acute pleural effusion as well as fundamental improvements in physicial diagnosis, pathology, and methods of investigation[21] are ignored by those who look upon pre-Civil War American medicine as unrelievedly bad, both institutionally and scientifically. This monolithic view, coupled with the belief that homeopathic therapeutics was better, has led some historians to treat the regulars' opposition to homeopathy as essentially a matter of fighting the competition and their diatribes against homeopathic theory as hardly more than rationalization. There is more to it. This is not the place to go into an examination of homeopathic theory, but a simple recital of its principles and its claim to be founded on experience (such as one often finds in the works of American social historians) in

19. *Reviews in American History* 6 (1978): 43-49.

20. J. E. Dezeimeris, *Lettres sur l'histoire de la médecine et sur la nécessité de l'enseignement de cette histoire* (Paris: Chez l'auteur, 1838) 85–86, quoted in Owsei Temkin, "The Historiography of Ideas in Medicine," in *The Double Face of Janus and Other Essays in the History of Medicine* (Baltimore: Johns Hopkins University Press, 1977) 114.

21. For some recent accounts see Erwin H. Ackerknecht, "Elisha Bartlett and the Philosophy of the Paris Clinical School," *Bull. Hist. Med.* 24 (1950): 43-60; Dale C. Smith, "Austin Flint and Auscultation in America," *J. Hist. Med.* 33 (1978): 129-149; idem, "Gerhard's Distinction between Typhoid and Typhus and Its Reception in America, 1833-1860," *Bull. Hist. Med.* 54 (1980): 368-385; Edward C. Atwater, "Morrill Wyman and the Aspiration of Acute Pleural Effusions, 1850. A Letter from New England," ibid. 46 (1972): 235-256; idem, " 'Squeezing Mother Nature'; Experimental Physiology in the United States before 1870," ibid. 52 (1978): 313-335. Nor should older work be ignored, such as William Osler, "Elisha Bartlett, a Rhode Island Philosopher," in his *An Alabama Student and Other Biographical Essays* (New York: Oxford University Press, 1908) 108-147; idem, "The Influence of Louis on American Medicine," in ibid. 189-210.

no way conveys its full flavor. Lester King's analysis is more useful,[22] but one must read Hahnemann's writings in considerable detail to appreciate what a farrago of speculation and nonsense they really are (which is not to deny the existence of works of comparable quality written by orthodox physicians). By concentrating on institutional, organizational, and professional aspects of medical history and related polemic literature while slighting or ignoring medical science, a number of historians have been led to treat homeopathy and to a lesser extent the other irregulars as the dominant influence in the development of nineteenth century medicine. As a result they end up with a distorted view not only of scientific history but also of the professional history that is their central concern.

I do not wish to suggest that all social historians interested in the history of medicine ignore medical science, any more than all medically trained medical historians ignore outside social, intellectual, and economic factors. But I would remind John Burnham when he asks, "Will Medical History Join the American Mainstream?" that medicine has its own intellectual mainstream, which historians of medicine neglect at their peril. The criticism implied in his question might well be reversed. With equal justice might one ask, "Will American history join the medical mainstream?"[23]

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22. Above, note 11.

23. The extent to which the teaching of medical history at the undergraduate level has deviated from the medical mainstream is emphasized in a recent editorial, "Medical History without Medicine," *J. Hist. Med.* 35 (1980): 5-7. Similar characteristics in a number of recent books in the social history of medicine are noted by Lloyd Stevenson in "A Second Opinion," *Bull. Hist. Med.* 54 (1980): 134-140. Part of the problem of course, is that each discipline is most apt to see the failings of outsiders who trespass upon it. Thus, in a recent review Andrew Abbott, a sociologist, attacks a work in the social history of medicine as bad sociology. "When are the social historians," he asks, "...going to face the necessity of disciplining their use of theory?"—or, to reword Burnham again, "Will American history join the sociological mainstream?" Review of *The Medicine Show* (1977) in *American Journal of Sociology* 85 (1979): 710-712.

Casuistry and Professional Obligations: The Regulation of Physicians by the Court of Conscience in The Late Middle Ages

Part II

DARREL W. AMUNDSEN

Obligation to Care

IT is well known that in classical antiquity physicians were generally loath to take on hopeless cases. There were various reasons for this, which I have discussed elsewhere.[81] With the advent of medical licensure requirements and medico-surgical guild monopolies, the physician's option of simply refusing to treat or of deserting a terminally ill patient certainly became more circumscribed. Antoninus, in his introductory discussion of the nature of medicine, asserts that "desperate cases which, according to the judgments of men, are held to be fatal, sometimes the diligent physician is able to cure, but rarely.... Therefore, clear to the end the physician ought to do what he can to cure the patient."[82] The question, however, still remained as to whether physicians should receive a fee for treating incurable cases. Antoninus' opinion was that "because the physician was created as an instrument of nature, the instrument of medicine should not be entirely withdrawn from the patient as long as nature does not succumb. Therefore, the physician does not sin by accepting a stipend for the treatment of an illness which, following the principles of the art of medicine, he believes is incurable." The physician must not hide that knowledge from those who have the immediate care of the patient, or cause unnecessary expenses, or promise entirely to cure him. He thus can justly receive his stipend

> as he displays in the care of his patient faithful attendance and true counsel...because the physician does not know what God has arranged concerning the patient, whether he will recover or die, although, according to the art of medicine, he ought to die. Therefore it is licit for the physician to pursue a cure and to accept a stipend clear up to the end or nearly.[83]

81. "The Liability of the Physician in Classical Greek Legal Theory and Practice," *Journal of the History of Medicine and Allied Sciences* 32 (1977): 202f.; "The Physician's Obligation to Prolong Life: A Medical Duty without Classical Roots," *The Hastings Center Report,* 8 no. 4 (1978): 23 ff.

82. Antoninus, *Summa theologica,* p. 281.

83. Ibid., pp. 289 f.

There is a statement attributed to Pope Symmachus, quoted in the *Decretum* of Gratian, to the effect that "there is not a great difference whether you inflict something fatal or allow it. He is proved to inflict death on the weak who does not prevent this when he is able to."[84] Although this says nothing directly concerning physicians, Joannes Teutonicus, in what became known as the *Glossa ordinaria* to the *Decretum* (c. 1216-1217), commented on this passage that the physician is obligated to treat both the poor and the rich gratis rather than to allow them to die. This gloss is the *locus classicus* for the summists' discussion of the question whether a physician is obligated to cure gratis rather than to allow a sick person to die. Thomas Aquinas considered the problem of the extent to which the physician is morally obligated to treat the poor gratuitously. Beginning with the remark that "no man is sufficient to bestow a work of mercy on all those who need it," he then writes that kindness ought first to be shown to those with whom one is united in any way (*propinqui*). In respect to others, if a man "stands in such a need that it is not easy to see how he can be succored otherwise, then one is bound to bestow the work of mercy on him." Thus a lawyer is not always obligated to defend the destitute "or else he would have to put aside all other business and occupy himself entirely in defending the poor. The same holds with physicians in respect to attending the sick."[85] The *Astesana* (c. 1317) follows Aquinas closely when discussing lawyers' obligations to defend the poor gratis, adding that "the same must be said concerning a physician as to the care of paupers."[86] The other summists rely also on Joannes Teutonicus' gloss on the passage from the *Decretum* quoted above (note 84), considering the obligation especially to exist if the alternative to free care is the death of the patient. This distinction, however, is not seen in Antoninus' short *Confessionale* (1473), where he simply says that a physician has sinned "if he has not freely visited poor patients who he knew were not able to pay, because he is obligated to do that and even to pay for the medicines if he is able."[87] Such a bald statement disregards the principles laid down both by Aquinas and Joannes Teutonicus, and may well have sent the perplexed confessor to Antoninus' more extensive treatment in his *Summa* (1477) where he addresses the problem in different places. In his discussion of the nature of medicine, he says that the physician must treat gratis paupers who

84. D. 83, 1. *Pars.*

85. Thomas Aquinas, *Summa theologica,* 2-2, 71, 1.

86. *Astesana,* 1. 39.

87. Antoninus, *Confessionale,* sv., *Circa medicos.*

are unable to pay, and not withdraw himself from their care, "because this may be killing them indirectly."[88] Later, when dealing with the question in greater detail, he says that the physician "is not obligated to provide for all the poor ill simply and indiscriminately, but according to the place and time presenting itself, just as it was said above concerning lawyers and as it is said concerning other works of mercy."[89]

Generally the treatment of our summists[90] is along the following lines, with slight variations: A physician is obligated to give care and counsel gratis to a sick pauper "for he is proved to inflict death on the weak who does not prevent it when he is able to." He ought to give care and medicines gratis rather than to allow a patient to die. This applies not only to the pauper but also to the rich. The physician should not only give care gratis but should even provide the medicines at his own expense for a sick rich man who is not willing to pay him anything, rather than to allow him to die. Antoninus here stipulates that the physician is thus obligated only if the patient or his relatives have called him. If the patient recovers, the physician can then demand his fee from him; if the patient dies, from his heirs. In the former, the grounds are that he has rightly managed the patient's affair; in the latter that he had rightly begun to conduct the affair, although the outcome did not follow. Nor may it be objected that the physician did it for charity (*causa pietatis*), unless he is united in some way (*propinquus*) to the patient. He is both able and obligated to treat such a man and can afterwards demand a fee, even if the patient refuses to allow himself to be treated, just as we can drag one against his will from a building that is about to collapse and confer a benefit on one against one's will. It must be assumed that the patient, by refusing treatment, is insane.

Sexual Impropriety

While our summists were vitally concerned with the physician's fee and his obligations to render treatment, they virtually ignored the possibility of sexual impropriety in the physician/patient relation. Only Chaimis (c. 1474) addressed the subject; he wrote that the physician has sinned mortally "if in the course of

88. Antoninus, *Summa theologica,* p. 277.

89. Ibid., p. 285.

90. *Pisanella,* sv., *Medicus vel cirurgicus;* Antoninus, *Summa theologica,* pp. 284 f., *Baptistina,* sv., *Medicus vel cirugicus,* 7; *Angelica,* sv., *Medicus,* 5 and 6; Chaimis, *Interrogatorium,* sv., *Medicis, phisicis, et cirogicis;* Fumus, *Summa Armilla,* sv., *De medico,* 1 and 2.

visiting women and because of their ailment has handled them intentionally and with libidinous intent and has proceeded on to anything dishonorable."[91] That most of our summists ignore the subject simply indicates that, as with envy and slander, the problem was subsumed not under professional but rather under personal morality.

Spiritual Obligations

The summists, however, were not at all reticent about the physician's spiritual obligations, for it is here that the greatest concerns of the casuists, moral theologians, and canonists arose when considering the physician's responsibilities and sins, as well as potential harm to the parient. While there was a fair degree of concern to protect the patient from physical and financial harm at the hands of the incompetent, negligent, or unscrupulous physician, it was infinitely more important to consider the well-being of the patient's soul. There was in early Christianity and in the early Middle Ages a tension between medicine and Christianity. This tension remained, however latent. It sometimes rose to the surface when the physician's goals and procedures obviously conflicted with spiritual priorities as defined by medieval Catholicism. In the *Decretum* Gratian quotes Ambrose's statement that "the precepts of medicine are contrary to the divine position." The passage goes on to say that physicians lure people away from fasts and vigils and meditation.[92] Yet the physician, according to Scripture, is to be honored with the honor due him for God created him, etc.[93] A uneasy *modus vivendi* existed between medicine and theology, the potential for conflict being maximal when the physician's interest in the health of the body appeared at variance with the church's interest in the health of the soul.

At the Fourth Lateran Council of 1215 a canon was enacted which soon became part of Gregory IX's official codification of canon law.[94] This canon, number 22 of the council, coming immediately after *Omnes utriusque sexus,* and bearing the incipit *Cum infirmitas* (or *Quum infirmitas*), is the only official canon from the Middle Ages that deals directly with the responsibilities of the secular physician. Its text reads:

> Since bodily infirmity is sometimes caused by sin, the Lord saying to the sick man whom he had healed: "Go and sin no more, lest some worse thing happen to thee"

91. Chaimis, *Interrogatorium,* sv., *Medicis, phisicis, et cirogicis.*

92. *De cons.,* D. 5. c. 21.

93. Ecclesiasticus 38.

94. This canon was included in the *Compilatio quarta* (5. 14. 4) and then in the *Decretales* (5. 38. 13).

> [John 5:14], we declare in the present decree and strictly command that when physicians of the body are called to the bedside of the sick, before all else they admonish them to call for the physician of souls, so that after spiritual health has been restored to them, the application of bodily medicine may be of greater benefit, for the cause being removed the effect will pass away. We publish this decree for the reason that some, when they are sick and are advised by the physician in the course of the sickness to attend to the salvation of their soul, give up all hope and yield more easily to the danger of death. If any physician shall transgress this decree after it has been published by the bishops, let him be cut off from the church till he has made suitable satisfaction for his transgression. And since the soul is far more precious than the body, we forbid under penalty of anathema that a physician advise a patient to have recourse to sinful means for the recovery of bodily health.[95]

This canon raises several important points. Since sickness is sometimes caused by sin, a physician, when called to a patient, must admonish him to call a priest before all else. Note that the interest expressed here is with the curative effect of confession, not with the desirability of ensuring that confession be made before a patient dies. Physicians who violate this requirement are to be strictly punished. The final stipulation in the canon is that physicians will be anathematized who "advise a patient to have recourse to sinful means for the recovery of bodily health." It is the summists' concern with this last stipulation that I shall consider first.

The *Astesana* (c. 1317) simply states that "since the soul is worth much more than the body, under the threat of anathema, we forbid any physician to recommend for physical health anything that results in danger to the soul."[96] The statements in the *Pisanella* (c. 1338),[97] *Baptistina* (c. 1480),[98] and *Angelica* (c. 1486)[99] are just as laconic, indeed even more so. All cite *Cum infirmitas*.[100] Antoninus (1473 and 1477), Chaimis (c. 1474), and Fumus (c. 1538) are more involved in their treatment, listing specific matters that a physician is forbidden

95. As translated by R. J. Schroeder, *Disciplinary Decrees of the General Councils* (St. Louis: Herder, 1957), 236.

96. *Astesana*, 5. 16. The Latin text here is nearly identical to the last sentence of *Cum infirmitas*. My translation of this passage from the *Astesana* is strictly literal compared with Schroeder's of *Cum infirmitas*.

97. *Pisanella*, sv., *Medicus vel cirurgicus*.

98. *Baptistina*, sv., *Medicus vel cirugicus*, 1.

99. *Angelica*, sv., *Medicus*, 7.

100. Cajetan, *Summula peccatorum* (1525), sv., *Peccata medicorum*, makes only a brief comment on this subject, follows a different format, and does not cite *Cum infirmitas*, referring to the action as a sin against divine, as opposed to canon, law, when physicians "advise to do anything against the safety of the soul, whatever mortal sin they advise. For according to the Apostle, evil must not be done that good of health or of life result."

to advise to a patient. All three begin their short lists by forbidding the physician to advise fornicating.[101] Fumus alone mentions masturbation (*pollutio*) and incantation, Antoninus and Chaimis forbid physicians to advise their patients to drink intoxicating beverages, and all three include the open category "and such things." Antoninus is the only one of our summists who discusses the circumstances of illicit counsel, maintaining that "a physician who says to a patient, 'I do not advise, but if you have intercourse with a woman, you will get well,' transgresses this regulation.... Therefore, the physician ought to beware in speaking, lest from concern for the situation of the illness he be aroused to doing something wrong."

Both Antoninus[102] and Chaimis[103] regarded it as a mortal sin for a physician to advise the sick to break the church's fasts or to eat meat on forbidden days, "without reasonable cause," or to encourage the healthy to break fast days, "saying that they are harmful and such like."

Abortion

If one now were asked what aspect of medical ethics has historically excited the most interest on the part of the Catholic Church, abortion would not be an unreasonable reply. Surprisingly, of all the summists surveyed, only two mention abortion in their discussions of physicians' sins.

The history of the treatment of abortion by the church through the end of the Middle Ages is complex and diverse, fraught with inconsistencies of interpretation.[104] The practice of abortion is condemned in early Christian literature, e.g., in the *Didache*,[105] the *Epistle of Barnabas*,[106] by Clement of Alexandria,[107] Minucius

101. Antoninus, *Confessionale*, sv., *Circa medicos; Summa theologica*, p. 282; Chaimis, *Interrogatorium*, sv., *Medicis, phisicis, et cirogicis;* Fumus, *Summa Armilla*, sv., *De medico*, 1.

102. Antoninus of Florence, *Confessionale*, sv., *Circa medicos; Summa theologica*, pp. 281 f. and 292.

103. Chaimis, *Interrogatorium*, sv., *Medicis, phisicis, et cirogicis.*

104. Two excellent discussions are John T. Noonan, Jr., "An Almost Absolute Value in History," in *The Morality of Abortion: Legal and Historical Perspectives*, ed. by J. T. Noonan, Jr. (Cambridge: Harvard University Press, 1970), 1-59; John Connery, *Abortion: The Development of the Roman Catholic Perspective* (Chicago: Loyola University Press, 1977).

105. *Didache*, 2. 2.

106. *Epistle of Barnabas*, 19. 5.

107. Clement, *Pedagogus*, 2. 10. 96. 1.

Felix,[108] and Tertullian.[109] In the fourth century the practice is denounced by one church council in the West[110] and by another in the East.[111] Jerome[112] and Augustine[113] make the distinction that abortion was not counted as homicide unless the fetus was "formed." The statements by Jerome and Augustine "were to be the *loci classici* on abortion in the West,"[114] and were transmitted by clerical writers and incorporated into penitentials through the mid-twelfth century. In the *Decretum* of Gratian abortion is reputed as homicide only when the fetus is formed ("vivified" or "ensouled").[115] In the *Decretales* of Gregory IX, two canons deal with the subject, one being in agreement with Gratian's interpretation,[116] the other applying the penalty for homicide to contraception and to the induced abortion of a fetus at any stage of development.[117] Considerable differences in interpretation of these two conflicting canons exist among various commentators on canon law, with one of the most influential, Hostiensis, arguing in favor of the stricter application. Among theologians, Thomas Aquinas held that the sin of abortion was a matter of degree that depended on the different stages of fetal development.[118] The subject of therapeutic abortion had not been directly addressed. Antoninus' contribution to the subject "may be taken to mark the beginning of a new era of thought on abortion."[119]

Antoninus makes only a passing and indiscriminate reference to abortion when treating the sins of physicians in his *Confessionale*. He says that a physician sins mortally "if he gives medicine to a pregnant woman to kill the fetus even for

108. Minucius Felix, *Octavius,* 2. 43.

109. Tertullian, *Apologeticum ad nationes,* 1. 15; *De anima,* 25. 5 f.

110. Elvira, A.D. 305, canon 63, in *Sacrorum conciliorum nova et amplissima collectio,* ed. by J. D. Mansi, et al. (new ed., Florence and Venice, 1795-98), vol. 2, col. 16.

111. Ancyra, A.D. 314, canon 21, ibid., vol. 2, col. 514.

112. Jerome, *Epistles,* 121. 4.

113. Augustine, *On Exodus,* 21. 80.

114. Noonan, "An Almost Absolute Value," p. 17.

115. C. 32 q. 2 c. 7 *(Aliquando).*

116. 5. 12. 20 *(Sicut ex).*

117. 5. 12. 5 *(Si aliquis).*

118. Thomas Aquinas, *Summa theologica,* 2-2, 64, 8, 2.

119. Noonan, "An Almost Absolute Value," p. 26. Connery is slightly less emphatic, saying "considerable impetus was given to the theological discussion in the work of Antoninus" *(Abortion,* p. 114).

the preservation of the mother."[120] Antoninus wrote his *Confessionale* in 1473. Four years later, in his *Summa theologica,* we find him making distinctions that conflict with his earlier statement in his *Confessionale.* In his *Summa* he deals with abortion first in a general discussion of homicide. John Connery writes:

> There he deals with it under the question whether homicide can be justified when necessary to avoid some evil. By way of example he speaks of women who have committed fornication, adultery, or incest and try to hide their crime by abortion or infanticide. They do this to preserve their reputation or even their lives. Antoninus says that none of these reasons excuses them from a very serious sin.... He admits, however, that there will be no question of homicide in causing an abortion unless the fetus is already formed. He says that this occurs after 40 days in the male fetus, 80 days in the female fetus, thus following in general the Aristotelian time distinction between male and female formation. He goes on to say that it is not permissible for a woman, who is going to die anyhow, to shorten her life to save the fetus, nor on the contrary is it permitted to take the life of the fetus to save the mother. Anyone who does this, and all who cooperate with such a person, will be guilty of homicide.[121]

It is in his section dealing with the sins of physicians that he makes a distinction "vital to the future discussion of abortion."[122] The contribution of Antoninus here lies not in his originality but in his adopting a distinction made a century earlier by an obscure theologian, John of Naples, whose *Quodlibeta* never saw print. Antoninus writes:

> physicians indeed sin mortally in giving medicines to pregnant women for producing abortion and for the death of the fetus [*mortem eius*], in order to cover up a sin. But if they do this to preserve the pregnant woman from the danger of death caused by the fetus [*in quo est ex puerperio*[123]], then, following John of Naples, a distinction must be made concerning this fetus, whether it is ensouled [*animatum*] or not ensouled with a rational soul. And if indeed it has been ensouled, the physician sins mortally by giving such medicine.

He goes on to argue that if the fetus is ensouled, the physician has caused both the physical and the spiritual death of the fetus. The physician who thus allows the mother to die by not giving her the abortifacient is not the cause of her death directly, because the disease from which she suffered is the direct cause. Nor has he caused her death indirectly, "because even if he had been able to preserve the mother from death by giving the medicine...he would have been the cause of the death of the fetus." On the other hand,

> if the fetus is not yet ensouled with a rational soul, he would then be able and ought to give such medicine [*posset tunc et deberet dare talem medicinam*], because even if it

120. Antoninus, *Confessionale,* sv., *Circa medicos.*

121. Connery, *Abortion,* pp. 114 f.

122. Ibid., p. 115.

123. Antoninus uses the word *puerperium* to designate the fetus whether *animatum* (ensouled) or not.

> prevents the animation of such a fetus, nevertheless, it would not be the cause of the death of any person [*causa mortis alicuius hominis*]. And this good follows, that it frees the mother from death. Therefore he ought to give it in such a case.... But if there is doubt concerning the fetus, whether it is ensouled with a rational soul or not, he seems by giving such medicine to sin mortally, because he exposed himself to the danger of mortal sin, that is of homicide.[124]

John Connery's comments here bear quoting:

> Since Antoninus was one of the great moral theologians of all times, acceptance by him of this opinion undoubtedly assured it a hearing. In fact, it is only through him that we know of this exception since the *Quodlibeta* of John of Naples were never published. Discussion of the exception will occupy the attention of moral theologians for the next three or four centuries, that is, until theories of delayed animation on which it was based begin to give way. Although Antoninus and John of Naples will have a respectable following, there will not be unanimous agreement with their opinion about this case.[125]

Only one of our summists besides Antoninus mentions abortion under the rubric of the sins of physicians, and this is Chaimis (c. 1474), who writes that a physician sins mortally if "he gives medicine to a pregnant woman for killing the child [*puerum*] in order to preserve the mother."[126] He apparently was unaffected by the distinction that John of Naples and Antoninus had set forth.

It is surprising that only two of the summists surveyed include any reference to abortion when discussing the sins of physicians, especially since the summists were provided with such an opportunity by the prohibition in *Cum infirmitas* of physicians' advising anything sinful, although this constraint did inspire several summists to list such offences as advising a patient to fornicate or to drink an intoxicating beverage. It is not that the rest of our summists were uninterested in the problem, since several include a discussion of abortion under *homicidium* or have a separate rubric *aborsus* or both.[127] Any argument to the effect that abortion was not considered a grave enough sin to warrant their attention cannot be entertained seriously. Nor is it reasonable to say that the interpretive dilemma presented by the issue scared them away, lest they be forced to come down on one side of a question or on the other, since they demonstrate no such qualms about other difficult issues. The only even moderately appealing explanation that presents itself is that the majority of our summists simply did not regard the decision as something which physicians or surgeons had to face. It is probable that during the period under consideration a woman would not have turned to a

124. Antoninus, *Summa theologica,* p. 283.

125. Connery, *Abortion,* p. 116.

126. Chaimis, *Interrogatorium,* sv., *Medicis, phisicis, et cirogicis.*

127. The *Baptistina* (c. 1480) discusses abortion under *homicidium,* Fumus (c. 1538) includes a separate section labelled *aborsus,* and the *Angelica* (c. 1486) does both.

male physician or surgeon for her obstetrical or gynecological needs, but rather to another woman such as a midwife or to one of the variety of female practitioners of the time. The inclusion of physicians in the discussions of abortion by John of Naples, Antoninus, and Chaimis may have been primarily for its theoretical value. Regardless of who should be involved, physician or midwife, by the early sixteenth century no theoretical defense or even definition of therapeutic abortion had yet been formulated. This fact left the conscientious physician or midwife in a moral quandary.

Euthanasia

The question was posed above as to what medico-ethical issue has usually been the greatest stimulus to discussion by Catholic theologians. Abortion was suggested as a reasonable response. A second would certainly be euthanasia. What we would call passive euthanasia, although never so considered in the Middle Ages, must be subsumed under the broader subject of the obligation to treat and to attempt. to curé hopeless cases. But what we would call active euthanasia is a different matter and is a subject never raised by our summists when discussing the sins of physicians. Active euthanasia, which we now regard as a moral category unto itself, was regarded throughout our period as simply homicide on the physician's part and suicide on the patient's, assuming willing involvement by the latter. Martin Aspilcuetta, better known as Navarrus, the leading canonist of the sixteenth century, and a post-Tridentine summist, writes in his *summa* (1568) that the physician sins who gives any medicine that he knows is harmful, "even if he administers it out of pity or in order to please the patient."[128] Navarrus' statement seems clear and unambiguous: Active euthanasia, whether motivated by pity or by the wish of the patient, is sinful. This must be one of the earliest articulations regarding active euthanasia in such precise terms. Navarrus gives as authority for his statement the commentary of Panormitanus (after 1421) on the decretal *Tua nos* (which itself, of course, says nothing on the subject of euthanasia). Panormitanus had simply given the opinion that those having custody or serving a sick person sin greatly if, motivated by "a sort of pity," they obey or indulge the "corrupted desire" of the ill man. Before active euthanasia was seen as a separate category, the closest the summists could have come to including relevant comments in their sections on

128. Navarrus, *Manuale sive Enchiridion confessariorum et poenitentium* (Lyons, 1574; copy at Gonzaga University) 25. 60. 2, sv., *De peccatis medici et chirurgi.*

physicians' sins would have been to have stated that it was a sin for a physician to kill or poison his patient intentionally, a statement as unlikely to be made as that it was a sin for a physician to steal a patient's property, rape his wife, or burn down his house, since it would be a sin not considered peculiar to the vocation under discussion.

Informing the Terminally Ill Patient

Throughout the history of medicine a prerogative that physicians have usually guarded jealously is whether to inform the terminally ill patient of his condition. Although having no direct authority to cite on this matter from canon law, several of our summists made pronouncements on the question of whether a physician who foresees the impending death of one of his patients is obligated to tell him. Antoninus is the earliest of our summists to ask that question and, as in the case of abortion, it is to the *Quodlibeta* of the fourteenth-century theologian, John of Naples, that he turns for an answer. John of Naples had distinguished as follows: Either the physician believes that it is very likely that such a prediction would be very useful for the patient, with a view toward his putting both his spiritual and his temporal affairs in order, or he believes the opposite, namely that it would not be useful, or he is in doubt about both. Now when the physician believes that the patient is in a state of mortal sin, and has made no provision for the disposal of his material possessions, thus producing grave dissension among his heirs, and since the patient, if he hears that death is imminent, will prepare himself for dying well, and will put his affairs in order, then the physician is obligated to inform the patient either directly or through another. If he does not do so, he sins mortally. On the other hand, if the physician believes with all likelihood that the announcement would profit the patient little or nothing, because he believes that the patient is in a good spiritual state and that his temporal affairs are in order, then he is not obligated to inform him. But he would do better by doing so, because any patient, regardless of how well his spiritual and temporal affairs might have been arranged, would set himself more in order having heard that death is near. If the physician is in doubt about the patient's spiritual and temporal state, he is obligated to inform him of impending death. This is especially important since both the condemnation of the patient's soul and harm to his temporal affairs can follow.[129] John of Naples, perhaps *via*

129. Antoninus, *Summa theologica*, pp. 285 f.

Antoninus, is followed in these assessments by the *Baptistina* (c. 1480),[130] *Angelica* (c. 1486),[131] and Fumus (c. 1538).[132]

Antoninus pursues the matter further than these three summists. He cites Galen as saying that however much the physician despairs of the health of a patient he should always strengthen him and tell him that he will recover. Antoninus writes that John of Naples reacts to Galen's statement with the assertion that it is not necessary to follow this precept, citing in contrast Gratian's quotation from Ambrose that "the precepts of medicine are contrary to the divine position."[133] Antoninus seems to appreciate both sides of the question, saying that "by predicting death much harm is done, and by being silent no damage is done. Nevertheless, in no case ought one to lie, as they are wont to do."[134] His final assessment, as given in his recapitulation at the end of the section on physicians, is that a physician sins mortally if,

> recognizing the impending death of a patient according to the art of medicine, he does not advise him or those caring for him or his confessor, so that they might make provision for him concerning the sacraments or concerning a will, if it is useful, and such like; fearing lest he get worse on account of this, or be in bad humor, or displease his family: following John of Naples in *Quodlibeta*.[135]

Whether or not to inform the patient thus remained, for the conscientious physician, an onus requiring that he be certain of his terminal patient's spiritual condition and the state of his arrangements for disposing of his affairs.

Requiring the Patient to Call a Confessor

While the stipulation that pertained to informing the terminal patient has no direct basis in canon law, *Cum infirmitas* appears quite specific in requiring that "before all else" physicians, when called to the bedside of the sick, "advise and persuade[136] them to call for the physician of souls." Two reasons are given for this requirement. The first is that confession had a curative effect. Since much illness

130. *Baptistina*, sv., *Medicus vel cirugicus*, 4.

131. Angelica, sv., *Medicus*, 12.

132. Fumus, *Summa Armilla*, sv., *De medico*.

133. *Decretum*, *De cons*. D. 5. c. 21.

134. Antoninus, *Summa theologica*, p. 286.

135. Ibid., p. 291.

136. The Latin here reads *moneant et inducant*, literally "let them advise and persuade," considerably stronger than Schroeder's translation, "admonish."

was caused by sin, the confession of sin would remove the cause, thus making the physician's attendance either superfluous or more effective. Second, if it was popularly believed that physicians advised the patient to call a confessor only if the hope of recovery was absent, patients thus advised would "give up all hope and yield more easily to the danger of death."

To anyone who attempts to understand how this canon should be applied, any of the following questions might arise: 1) Does this apply to every new case a physician undertakes? 2) Since the physician must "advise and persuade" *(moneant et inducant)* the patient to call a confessor, is he also responsible to ensure that the patient both agree and comply? 3) If the patient is unwilling to call a confessor, may the physician treat him anyway, or must he withdraw from the case? 4) May the physician "advise and persuade" through another, e.g., relatives, friends, or attendants of the patient or must he do so himself? 5) If physicians simply fail to refuse to comply on the grounds that it is contrary to the established precepts of their art, can this canon be abrogated through non-use and prescribed by contrary custom? (Cf. below, at note 152).

All our summists who wrote after Lateran IV include a discussion of *Cum infirmitas*, although their discussions vary widely in length, detail, and sensitivity to the problems posed by this canon. It should be noted that none of the summists surveyed dealt with *all* the questions posed above. Several give basically a short, rigid, and dogmatic demand that the physician persuade the patient to confess, without discussing the possibility of exceptions.[137] Even Antoninus, although he discusses the problems at some length in his *Summa* (1477), simply makes the bald statement in his short *Confessionale* (1473) that a physician has sinned "if he has not abided by the precept made for physicians, namely that they should persuade their patients when they first are called to them that they must make confession, because, following the authorities [*doctores*], it is a mortal sin."[138]

Among those who considered the question whether physicians are obligated in all cases to advise the patient to call a confessor, opinions vary. Antoninus, in his *Summa* (1477), notes that some physicians comply with *Cum infirmitas* only when dealing with patients who they think are mortally ill and not under other circumstances. "But such physicians do not fulfil this constitution and that is clear from the text of the decretal itself. There it is stated: 'for the reason that some, when they are sick and are advised by the physician in the course of the sickness to

137. *Astesana* (c. 1317), 5. 16; *Pisanella* (c. 1338), sv., *Medicus vel cirurgicus;* Chaimis (c. 1474), *Interrogatorium,* sv., *Medicis, phisicis, et cirogicis.*

138. Antoninus, *Confessionale,* sv., *Circa medicos.*

attend to the salvation of their soul, give up all hope and yield more easily to the danger of death.' " He then quotes the commentary of Joannes Andreas on this section of *Cum infirmitas,* to the effect that "from this patients will truly know that physicians say this in every illness, in mortal illnesses and also in those not judged fatal; then fear and danger will cease."[139] Andreas' interpretation appears consonant with the stated intent of the decretal, since if physicians generally advised only terminal patients, or those suffering from dangerous illnesses, to confess, the effect of such advice on patients could well be deleterious. But the other summists who consider this question seem to move away from the intent of the canon. The *Baptistina* (c. 1480) lays it down that "the safe judgment always being the better judgment," this constitution applies only to dangerous or doubtful ailments. He gives as examples "any accident or any pain of the head" and any ailment that is "dangerous in the physician's opinion, for instance continuous fevers, pleurisy, quinsy, colic pain of the kidneys, and such like." On the other hand, the physician is not obligated to advise the patient to confess if he has "an ephemeral fever and such like."[140] The *Angelica* (c. 1486) states that in any sudden accident which requires immediate treatment the physician is excused. "Although it is best that he persuade in every illness," he is not obligated except in dangerous illnesses. "And I call it 'dangerous' when one can credibly demonstrate a danger of death."[141] Fumus (c. 1538) holds the physician obligated whenever the patient is in a serious illness, "even if not in imminent danger of death."[142] Cajetan (1525) feels that it must be an illness "from which a man truly lies ill. A physician is not held to this in every illness without distinction, lest the advice come into derision." He advises taking a middle road between extremely dangerous cases and ailments such as gout.[143]

Of the summists surveyed, only one addressed the question whether a physician is obligated to ensure the patient's compliance in making a confession, without also considering the obviously correlative question whether the physician must withdraw from the case if the patient does not call for a confessor. Chaimis (c. 1474) simply writes that their advice and persuasion must be *cum effectu,* i.e., with result, before they are permitted to undertake care. As authority for this he cites the commentaries of Hostiensis, Joannes Andreas, and Antonius

139. Antoninus, *Summa theologica,* p. 285.

140. *Baptistina,* sv., *Medicus vel cirugicus,* 3.

141. *Angelica,* sv., *Medicus,* 8 and 9.

142. Fumus, *Summa Armilla,* sv., *De medico.*

143. Cajetan, *Summula peccatorum,* sv., *Peccata medicorum.*

de Butrio on *Cum infirmitas.*[144] Antoninus (1477) instructs his readers to "note that physicians must observe this rule 'before all things.' " This he takes to mean "before they raise a hand to treat, or before they come to an agreement on a fee," citing Joannes Andreas. But must the physician ensure his patient's compliance? Antoninus says that Hostiensis, interpreting *inducant* to be *cum effectu,* insists that the physician not undertake the case otherwise. "But such an opinion as this," writes Antoninus, "seems harsh, since succor must be given *secundum ordinem caritatis,* to those who are in danger, however stubborn they may be." He maintains that the text itself does not specifically require that the physician's advice be followed and cites the opinion of Petrus de Palude that physicians are only obligated to admonish.[145] When the question is discussed in the *Baptistina* (c. 1480), Panormitanus is cited as having interpreted *moneant et inducant* as *cum effectu,* "namely that they [sc., the patients] call a priest: otherwise it does not satisfy this precept." Noting that others say "not unreasonably that when a physician does as much as he can to persuade the patient, even by threatening to abandon him," and still the patient absolutely refuses, the physician can proceed with the case, the *Baptistina* concurs. The reasoning is that if the physician withdrew, the patient might give up hope and die. But if he is cured, he might be able to be persuaded to tend to his spiritual needs.[146] The *Angelica* (c. 1486) is in agreement with the *Baptistina* here, holding that an interpretation which required a physician to desert the recalcitrant patient would thus make "the precept of the church seem against the precept of God."[147] Fumus (c. 1538) writes that if the patient "is not willing to confess, he ought not to be abandoned on that account, lest perhaps he despair and die, for this seems to be contrary to charity by which we are held to do good even to the bad and to the unjust, and this seems to me to be a good conclusion and sufficiently discreet."[148]

Three of the summists speak directly or indirectly to the question whether the physician may advise and persuade through another. The *Pisanella* (c. 1338) flatly states that it is a rule that the physicians "themselves advise and order" that patients call the confessor.[149] Cajetan (1525), on the other hand, tells his reader:

144. Chaimis, *Interrogatorium,* sv., *Medicis, phisicis, et cirogicis.*

145. Antoninus, *Summa theologica,* p. 285.

146. *Baptistina,* sv., *Medicus vel cirugicus,* 1.

147. *Angelica,* sv., *Medicus,* 8.

148. Fumus, *Summa Armilla,* sv., *De medico.*

149. *Pisanella,* sv., *Medicus vel cirurgicus.*

"Stop! lest you too quickly judge a physician guilty of mortal sin, because physicians are accustomed to do this not through themselves but through relatives or others."[150] And Fumus (c.1538) simply says that it is sufficient for them to have those near the patient urge the patient to call a confessor.[151]

Seven of our summists consider the question whether *Cum infirmitas* can be abrogated through non-use and prescribed by contrary custom. A general principle in late medieval canon law was that a custom that prevailed throughout Christendom, if the custom was reasonable, abrogated the written law. The classic doctrine was that the custom must be in accord with reason and that no custom could claim to be reasonable if it was prejudicial to ecclesiastical liberty and discipline. Gregory IX admitted this doctrine in the decretal *Cum tanto (Quum tanto)*.[152] A clear definition of what was and what was not "prejudicial to ecclesiastical liberty and discipline," of course, could not be achieved with the inclusiveness necessary to cover every exigency. The *Astesana* (c. 1317),[153] *Pisanella* (c. 1338),[154] and Antoninus in his *Summa* (1477)[155] simply say that it cannot be abrogated by any custom, the former two adding "since it was introduced for the health of souls." The *Baptistina* (c. 1480) says the same, citing Panormitanus, and maintaining that "such a custom does not have in itself any reason [*ratio*]. On the contrary, from it many evils result, as in the text."[156] The *Angelica* (c. 1486) states forcefully that "it cannot be said to be abrogated on account of contrary custom, for it is not custom but is corruption and against good morals and therefore does not have strength."[157] Fumus (c. 1538) says the same, nearly verbatim, but then concedes that considering that the requirement of *Cum infirmitas* "opposes their art which always predicts good hope, they do not sin mortally" if they merely advise those near the patient to urge him to confess.[158] In this he is close to Cajetan's development of the question. After mentioning that

150. Cajetan, *Summula peccatorum*, sv., *Peccata medicorum.*

151. Fumus, *Summa Armilla*, sv., *De medico.*

152. *Decretales*, 1. 4. 11.

153. *Astesana*, 5. 16.

154. *Pisanella*, sv., *Medicus vel cirurgicus.*

155. Antoninus, *Summa theologica*, p. 285.

156. *Baptistina*, sv., *Medicus vel cirugicus*, pr.

157. *Angelica*, sv., *Medicus*, 8.

158. Fumus, *Summa Armilla*, sv., *De medico.*

physicians are accustomed to advise patients through relatives or others, Cajetan (1525) writes:

> For if this constitution has been thus accepted by consensus of those practicing, and the prelates, who have the authority to discipline such physicians, ignore those who violate it, physicians are excused from mortal sin, since it is established that decretals of substantive law [*ius positivum*] are abrogated by non-use, especially those never having been received accurately, as seems to be the case here. And this decree seems reasonable so far as it was written, but never affirmed by the consensus of those practicing, because it is opposed to the role [*officium*] of physicians and on account of this they always seem to have withstood it. Physicians indeed are bound by the precept of their art always to present pleasant things which are of health and hope for the patient. On that account they say not to look to them to bring in sorrowful tidings of such a kind if there is danger; and if there is no danger, they ought not to expose themselves or their words to ridicule. Understand these things to excuse the custom of good physicians.[159]

It is obvious that by the early sixteenth century there was no uniformity either of practice or of interpretation of the major provisions of *Cum infirmitas*. In 1566, a very few decades after Cajetan wrote his *Summula peccatorum* (1525), and three years after the adjournment of the Council of Trent, Pope Pius V renewed *Cum infirmitas* in his constitution *Super gregem*. There it was declared that physicians were to discontinue their treatment of a patient after the third day if he failed to produce a document signed by a confessor certifying that the patient had duly confessed. Physicians violating this rule were to be declared infamous, denied the privilege of practicing, and ejected from their university or medical and surgical associations.[160]

Conclusions

We have seen that many of the summists were thorough in detailing and analyzing the sins to which physicians were considered most susceptible. They impressed upon physicians that failure to have the requisite expertness, failure to

159. Cajetan, *Summula peccatorum,* sv., *Peccata medicorum.*

160. See R. J. Schroeder, *Disciplinary Decrees,* pp. 263 f. When the *Cum infirmitas* was promulgated, it applied to all physicians and any physician who attempted to live in accord with the dictates of the church would have endeavored to achieve some *modus operandi* consistent with at least a liberal interpretation of its provisions. By the time that the post-Tridentine *Super gregem* was promulgated, many physicians were at least nominally within the ranks of Protestantism and thus no longer subject either under canon law or in conscience to the regulations of Roman Catholicism. Catholics receiving doctorates in medicine were apparently obligated to swear that they would honor the provisions of *Super gregem.* For an example, see Martha Teach Gnudi and Jerome Pierce Webster, *The Life and Times of Gaspare Tagliacozzi, Surgeon of Bologna 1545-1599* (New York: Herbert Reichner, 1950), 55 f. for a translation, 388 f. for the Latin text of such an oath.

exercise the necessary diligence, and failure to maintain the traditions of the art are mortal sins. The obligation to extend charity to the poor was important to most of our summists, as was the treatment of the rich miser. Also the physician's obligations to the spiritual well-being of the patient weighed heavily on the minds of the summists.

Now that we have seen the scope of the summists' interests and the details of their analyses, an obvious question must be posed: What if any effect might all this have had on the shaping of medieval medical ethics and on actual practice? As we consider the question just posed, it is absolutely necessary to bear in mind that medieval society was, with the exception of a small number of Jews and heretics, exclusively Christian. There was only one church and everyone was a member of it. The allegiance, willing or otherwise, of virtually the entire population of Western Europe, coupled with the prestige of ecclesiastical institutions, enabled the church to exercise coercive jurisdiction over areas of life that now would be the concern of either secular authority or of the individual conscience. The church promulgated laws and expected obedience. Her coercive jurisdiction was exercised through ecclesiastical courts where penalties ranging from penance to imprisonment to excommunication were imposed. Church courts were of two different but complementary kinds, the *forum externum* and the *forum internum.* The former, the external, also called the *ius fori,*

> represented the right of the Church to judge her members in relation to the social body of Christendom.... The external forum was simply the jurisdication of the Canonical courts. On the other hand, the internal forum, termed the *ius poli* in the Middle Ages, represented the right of the Church to judge her members in view of their personal and intimate relationship to God. This forum was simply the confessional in which the believer confessed his sins to his priest and received moral and spiritual guidance.[161]

The extent to which the confessional influenced ethics and conduct cannot be gauged with certainty. A few observations, however, can be made legitimately. Thomas Tentler, whose studies of the *Summae confessorum* qualify him as a leading authority on the historical significance of the genre, likes to speak of the confessional as an instrument of social control. While he concedes that he "cannot prove the importance of confession quantitatively," nevertheless he "can say a great deal about the teachings that religious authorities wanted the Christian community to believe and put into practice."[162] It cannot reasonably be

161. J. W. Baldwin, *The Medieval Theories of the Just Price: Romanists, Canonists, and Theologians in the Twelfth and Thirteenth Centuries,* Transactions of the American Philosophical Society, n.s.v. 49, pt. 4 (Philadelphia, 1959), 57.

162. Tentler, *Sin and Confession,* p. xv.

denied that the confessional literature was written for the purpose of educating the clergy to the end that they, in turn, should educate the laity as part of the confessional objective. For the goal of confession was not only to forgive known sins committed but also 1) to educate the laity so that they might be able to identify previously unknown sins, both of commission and of omission, in their lives, and 2) to correct sinful practices. The best confession was one that led to a change of life, and a changed life should be one in as close conformity to the expectations and standards of the church as possible. Were the expectations and standards expressed in this literature unrealistic products of ascetic theologians far removed from the realities of life? Tentler writes that "it would have been impractical and self-defeating" for these authors "to appeal to ideas and expectations that were novel, irrelevant, or unintelligible." For what he sees in this body of literature "is the practicality of men who understood the inherent power of the system placed at the disposal of every rank of ecclesiastical authority."[163] For men in the *forum internum*—the forum of conscience—were responsible not only to God but also, and quite directly, to men who had the authority "to loose and to bind." And this authority "to loose and to bind," although ultimately of eternal consequence, was applicable to the present life in that it included the authority, indeed the responsibility, to grant forgiveness only to those who satisfied the requirements of the confessional and to impose sanctions upon those who refused. And the ultimate sanction, excommunication, when imposed upon anyone who exercised his vocation by license, would deprive such a one of his livelihood.

There was a strong tradition in the church, from Augustine through Gratian, in canon law and conciliar legislation, that whatever was gained through dishonest practices had to be restored in full before remission of sin could be given, before *ego te absolvo* could be pronounced efficaciously.[164] Restitution was an absolute condition of forgiveness and the confessor had considerable freedom of discretion in determining situations in which restitution must be made. The principle of restitution was applied to much besides ill-gotten gain, indeed to damages generally. The *Angelica* defines the nature of the obligation as "any satisfaction that must be done to someone else."[165]

Tentler considers the confessional system of the late Middle Ages a "most effective means of social control" because of its "clear and explicit expectations,

163. Ibid.

164. The classic study of the doctrine of restitution is Karl Weinzierl, *Die Restitutionslehre der Frühscholastik* (Munich: M. Hueber, 1936). Tentler treats the subject in *Sin and Confession,* pp. 340 ff.

165. As quoted by Tentler, *Sin and Confession,* p. 341.

clear and direct accountability" and, in the same context, he says of the *Summae confessorum* that "they are, if any books ever were, devoted to the clarification, definition, and publication of expectations, as well as to the assertion of the legitimacy of the authority of priest over penitents and the hierarchy over the church."[166]

Medieval economic historians have commented on the possible effects of the *forum internum* on merchants' activities in the late Middle Ages. Their conclusions are generally expressed thus: "... although undoubtedly of influence, gives no assurance that the penitent merchant followed the ideals of his confessor."[167] "Unfortunately, we have no direct indication of what the merchant thought. He was not a moralist and he did not write moral treatises. Nor did the confessor assess the effects of his work quantitatively. The connective doubtless was there, but the historian has no means of accurately charting it."[168]

The medical historian also cannot "accurately chart" the influence of the confessional on medical ethics and practice if "accurately chart" means to subject a problem to anything that even approaches statistical certainty. But the medical historian has at his disposal various types of medical and surgical literature that directly or indirectly shed some light on the state of medical deontology in the late Middle Ages. Writings of this kind should be investigated thoroughly with such an objective in view after a more extensive and comprehensive study of late medieval casuistic literature shall have been made than was possible in the present essay.

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166. Tentler, "Response and Retractatio," p. 137.

167. Baldwin, *Just Price*, p. 10.

168. Gilchrist, *The Church and Economic Activity*, p. 50.

The Identity of the Plague of Justinian [Part I]

TIMOTHY L. BRATTON

WHILE most scholars are agreed that the fearsome illness that struck Constantinople in 543 A.D. was caused by *Yersinia pestis,* the plague bacillus, considerable disagreement exists as to the exact form in which the plague manifested itself.[1] There are bubonic, pneumonic, septicaemic, cutaneous, vesicular, and anginal (tonsillar) varieties of plague; while most epidemics begin with bubonic plague, the transition to and coexistence with the other forms of the disease is possible over the course of the pestilence. The exact identification of the type involved is of considerable demographic importance. Since the plague raged

1. T. H. Hollingsworth, *Historical Demography* (Ithaca, N.Y.: Cornell University Press, 1969) 357, 367, argues strongly for pneumonic plague. R. Pollitzer, *Plague* (Geneva: World Health Organization, 1954) 13, leans towards bubonic plague, but does not exclude the possibility of the pneumonic form. Jean-Noël Biraben, *Les hommes et la peste en France et dans les pays européens et méditerranéens,* École des hautes études en sciences sociales, Centre de recherches historiques, Civilisations et Societés 35 (Paris: Mouton & Co., 1975) 1:25-6, complains about the vagueness of the source materials, but mentions buboes (thus implying bubonic plague); at 1:40-1 he attacks the possibility of autumnal plague, and thus by inference that of pneumonic plague. L. Fabian Hirst, *The Conquest of Plague; a Study of the Evolution of Epidemiology* (Oxford: Clarendon Press, 1953) 31, suggests that the Plague of Justinian was predominantly bubonic, but with other mixed plague types present. J.F.D. Shrewsbury, *A History of Bubonic Plague in the British Isles* (Cambridge: Cambridge University Press, 1970) 18, identifies the pestilence as "an epidemic of bubonic plague, although it is evident from [Procopius'] account that during this period a number of epidemic diseases in addition to plague afflicted that empire." Josiah Cox Russell, *Late Ancient and Medieval Population,* Transactions of the American Philosophical Society, n.s.v. 48, pt. 3 (June, 1958) 40, is inclined towards bubonic plague, since the erratic spread of the sixth-century disease suggests transmission by fleas. Philip Ziegler, *The Black Death* (N.Y.: Harper Torchbooks, 1971) 24-5, thinks that "in its original form" the pandemic was bubonic plague. Frederick F. Cartwright, in collaboration with Michael D. Biddiss, *Disease and History* (N.Y.: Thomas Y. Crowell Company, 1972) 17, claim that the disease was "undoubtedly bubonic plague," but go on to argue, 31-2, that the mortality of thousands at Constantinople must have meant a shift to the more lethal pneumonic type during the course of the epidemic. Hans Zinsser, *Rats, Lice and History* (1935; repr., N.Y.: Bantam Books, Inc., 1967) 109, states that the pestilence was "mainly one of bubonic plague," although he also appears to confuse vesicular or carbuncular plague with secondary smallpox infection. Geoffrey Marks and William K. Beatty, *Epidemics* (N.Y.: Charles Scribner's Sons, 1976) 46 and footnote, feel that "the epidemic was bubonic plague with pneumonic plague seldom if ever present," a position also taken up by Josiah Cox Russell, "That Earlier Plague," *Demography* 5 (1968): 179, using the same evidence as Marks and Beatty. Michael W. Dols, *The Black Death in the Middle East* (Princeton, N.J.: Princeton University Press, 1977) 16, describes Procopius' account as the "first unequivocal account of bubonic plague"; attributions of pneumonic plague were "not proved" (p. 17, footnote 15). Finally, William H. McNeill, *Plagues and Peoples* (Garden City, N.Y.: Anchor Books, 1976) 109, claims that the pandemic "can confidently be identified as bubonic."

for four months in Constantinople,[2] pneumonic plague (which was almost invariably fatal in the medieval period[3]) could have sustained itself over that period only if the population of the city had been in the neighborhood of a half-million people.[4] On the other hand, because of the erratic mechanism of its propagation, an epidemic of flea-spread bubonic plague could have remained endemic for four months in a much smaller Constantinople, with far less loss of population.[5]

Procopius, secretary to Justinian's great general Belisarius, had returned to Constantinople with his commander after the fall of Ravenna to the Byzantines in 540 A.D., and was a eyewitness to the outbreak of the plague in the capital three years later.[6] Much of the evidence that he presents argues strongly in favor of at least a bubonic origin to the disease that afflicted Constantinople.

The pestilence first appeared in 542 A.D. at Pelusium in Egypt, a seaport located where the Pelusic channel of the Nile enters the Mediterranean.[7] It is far more likely that the disease had been transmitted from the African interior; the later Byzantine historian Evagrius the Scholastic claimed that the plague had

2. Procopius, *History of the Wars* 2.23.1. The text (including English translation) used was that in the Loeb Classical Library edited and translated by H.B. Dewing (N.Y.: Macmillan Co., 1914).

3. Spread by exhalation of infected sputum droplets, primary pneumonic plague is perhaps the most infectious and deadly of epidemic diseases; see Dols, pp. 226-27. Untreated pneumonic plague usually kills its victims within one to four days, according to Shrewsbury, p. 6; during the Manchurian pneumonic plague epidemic of 1921, the average patient succumbed after only 1.8 days of illness, says Pollitzer, p. 418. For purposes of mathematical theory, Hollingsworth, p. 365, assigns a morbidity of 96% to pneumonic plague patients.

4. Hollingsworth, p. 367, estimates the population of Constantinople as 508,000 with 244,000 plague deaths in 543 A.D., although he claims that most of the mortality occurred in only a seven-week period. Note that 48% of the total population would have died if these calculations are correct.

5. The seemingly random movement of plague within cities that so bewildered medieval man was due probably to rat migrations from infected buildings; see Pollitzer, p. 300. The chances of recovering from bubonic plague were somewhat better than those of recovery from pneumonic plague; Shrewsbury, p. 5, thinks that about 60% of those infected with bubonic plague succumbed. Probably the most spectacular English example of plague mortality is that cited by Shrewsbury on pp. 522-29: in 1665-66, because the Rector of the small town of Eyam, Derbyshire, the Rev. W. Mompesson, talked his parishioners into waiting out the plague without any effective prophylactic measures, the town lost 267 out of 350 citizens, or 76%. However, in most urban plagues, "the disease exterminated one-third of the available human material, which is about the maximum degree of destruction that a major, virulent epidemic of bubonic plague can accomplish in a community ignorant of its nature" (Shrewsbury, p. 192). Hollingsworth, p. 365, uses an estimated morbidity rate of 50% in his mathematical model for bubonic plague cases.

6. J. A. S. Evans, *Procopius,* Twayne's World Authors Series, No. 170 (N.Y.: Twayne Publishers, Inc., 1972) 36-7.

7. Procopius, *History of the Wars* 2.22.6; Dols, p. 14.

originated in Ethiopia.[8] However, as the attribution of mysterious plagues to Ethiopia had been a literary convention since the time of Thucydides,[9] Evagrius' story may be doubted; it is much more probable that the Plague of Justinian originated in the Central African plague reservoir in Uganda, Kenya, and Zaire, from which it was transmitted to the Nile, perhaps by caravans trafficking in slaves and ivory.[10]

Upon reaching Egypt, the epidemic split into two arms, one travelling west towards Alexandria (infecting the rest of Egypt in the process), while the other moved into Palestine. Procopius described how the disease moved as if "by fixed arrangement, and to tarry for a specified time in each country." He perceptively

8. Evagrius Scholasticus, *Ecclesiastical History* 4.29.

9. See Thucydides, *Peloponnesian War* 2.48; Dols, p. 14; Zinsser, p. 107.

10. The natural plague vector in Central Africa is the so-called multimammate mouse, *Mastomys coucha* (*Rattus natalensis* until 1958, when study of its chromosomes proved that it was not a *Rattus* subspecies); it is intermediate in size between a mouse and a rat. See M. Baltazard, "Déclin et destin d'une maladie infectieuse: le peste," *Bulletin of the World Health Organization* 23 (1960): 253. These semi-domesticated creatures infect outlying buildings and grain stores in human settlements and replace house mice as domestic pests in rural areas; they explore wild gerbil holes during their nocturnal wanderings, thus acquiring plague-infected gerbil fleas in times of epizootics. The multimammate mouse's own flea fauna of *Xenopsylla brasiliensis* can in turn transmit the disease to humans. See Hirst, pp. 202-03. Even if the role of transmission by human caravans, most likely by infected fleas on people and their goods, is denied, the disease could have been passed northward by rodent contacts alone, especially in times of overpopulation. Dols, pp. 69-70, footnote 3, mentions the Egyptian grass rat, *Arvicanthis n. niloticus*, which is most common in cultivated areas; it also harbors *Xenopsylla cheopis* fleas, the variety most likely to transmit plague to black rats and men. From there plague could have been transmitted to Egyptian black rat, *R. rattus alexandrinus*. Debates have raged for years over the presence of the black rat in Europe during the sixth century, but a variety of archaeological and artistic evidence—as well as the absence of any other effective, widely-distributed rodent vector likely to have been in proximity with humans—seems to have tipped the balance in favor of the black rat's role. See the strong arguments presented by Hirst, pp. 124-26; G. Girard, "A époque remonte la présence du rat ('Rattus rattus') en Europe?", *Bulletin de la Société de Pathologie Exotique* 67 (1974): 601-06; M. Baltazard, pp. 251, 261; Shrewsbury, pp. 9-11.

The Ethiopian origins of the plague cannot be ruled out entirely; Dols, p. 15, suggests that plague was endemic to Ethiopia in the early Middle Ages. The thirteenth-century Egyptian physician Ibn an-Nafis, after clearly describing plague buboes, mentioned that the illness was common in Ethiopia, where it was called *jaghalah*. This is surprising since in recent times Ethiopia seems to have escaped the plague entirely. Bubonic plague is not mentioned among the many epidemics that broke out there during the terrible famine of the late nineteenth century; see Richard Pankhurst, "The Great Ethiopian Famine of 1888-1892; A New Assessment," *Journal of the History of Medicine and Allied Sciences* 21 (1966): 271. Yet competition for the remaining supplies of food ought to have encouraged rodent proximity to humans, who in turn would have had weakened resistance to plague. Black and related rats are not a feature of Ethiopia; see Dr. Ernst Schwartz, "Classification, Origin and Distribution of Commensal Rats," *Bulletin of the World Health Organization* 23 (1960): 414, Figure 3. Recent World Health Organization literature does not list Ethiopia as a plague center; might it not be the case that medieval plague epidemics were introduced *into* that country by merchants who had visited Central Africa? In any event, one must decide whether or not "Ethiopia" is a Byzantine catch-word for Africa south of Egypt, or if Ethiopian caravans brought the disease to Egypt either from their homeland or farther south.

noticed how the "disease always took its start from the coast, and from there went up to the interior."[11] The explanation for this behavior was put succinctly by the late André Siegfried:

> From the initial sources, which are inland, the infection first runs down to the ports, as if by gravity. From the ports it spreads out along the pattern of the main sea routes...but without penetrating at once to the centre of the continents. The mechanism of this topographical limitation is fairly clear: the rats travel in ships, of which they seem to be fond, then disembark in the ports, carrying with them their infected fleas, which they pass on to the local marine population nearest the coast.[12]

Plague usually strikes inland along major traffic routes; its travel to rural areas is more haphazard because of poor communication, and does much to explain the seemingly aimless path of interior epidemics.[13] While fleas can be carried in such ship-borne cargoes as grain, raw cotton, bags, rags, and hides, their infected host rats are far more likely to spread the disease ashore.[14]

In the spring of 543 A.D., the plague finally arrived at Constantinople. Procopius does not indicate whether the plague from Palestine had worked its way along the coast of Asia Minor to the capital; a far more likely source was the Egyptian corn fleet. Almost since the day of its founding, Constantinople had regarded Egypt as its granary.[15] Unfortunately, a grain ship would have been an almost ideal environment for both rats and their fleas.[16]

11. Procopius, *History of the Wars* 2.22.6-7,9.

12. André Siegfried, *Routes of Contagion,* trans. Jean Henderson and Mercedes Clarasó (N.Y.: Harcourt, Brace & World, Inc., 1965) 68-9.

13. Pollitzer, pp. 490-91.

14. Ibid., pp. 387, 389-90.

15. A. A. Vasiliev, *History of the Byzantine Empire* (1958; repr., Madison, Wisconsin: University of Wisconsin Press, 1970), 1:196.

16. It is obvious that rats would relish a voyage on a grain ship; however, the larvae of *X. cheopis* live on organic matter, especially cereal debris, so the ship's environment would have been ideal for them as well. See Dols, p. 163; Pollitzer, p. 323. The role of long-range transoceanic voyages in the spreading of plague has been doubted; Pollitzer, pp. 389-90, says that "it is not likely that a long-distance transportation of infected fleas plays a generally important role in the dissemination of plague," since otherwise plague transmission by ships would have remained common up to modern times in spite of rat control because of live fleas in the cargo. The survival of infected rats is much more important as a plague vector than the survival of infected fleas. Shrewsbury, p. 158, agrees; even had every rat on board died before the ship reached port, the remaining starving fleas would have been too far below decks to attack crew members, and the disease would have died out without any consequences. However, as blocked fleas, under the right conditions of humidity and environment, can survive up to fifty days without food, their role cannot be ruled out entirely; see Dols, p. 71. The Egypt-Constantinople grain run, under ideal weather conditions, was short enough that a sizeable number of infected rats and fleas would have made it to shore. Hélenè Antoniadis-Bibibou, *Études d'histoire maritime de Byzance a propos du "Théme des Caravisiens"* (Paris: S.E.V.P.E.N., 1966) 28, footnote, describes medieval sources that recorded a voyage of 12 days for

Procopius informs his readers that the epidemic reached Constantinople "in the middle of spring,"[17] which would also be characteristic of bubonic plague. Fleas, which can live up to a year, dislike cold weather, and they will hibernate and cease reproduction during the winter.[18] They rouse themselves into activity in a moderately warm and moist climate, with temperatures of 15-20° C. (59-68° F.) and a relative humidity of 85-95%.[19] Such would have been the likely conditions in Constantinople during the spring of 543 A.D. If the epidemic broke out in "the middle of spring," it must have been late April or early May, which also fits known European plague patterns. Rat epizootics can appear as early as April, with human cases occurring shortly thereafter.[20]

The disease, in humans, began with a sudden fever "of such a languid sort from its commencement" that neither the patient nor the doctor had any suspicion of danger.[21] After an incubation period of 2-6 days,[22] during which the bacilli of *Yersinia pestis* multiply at the site of the flea-bite that introduced them into the body of the human victim, a fever of 39-40° C. (103-104° F.) appears, sometimes within a matter of hours.[23] The following passage of Procopius, as translated by H.B. Dewing, is of sufficient interest to be reproduced fully:

> But on the same day in some cases, in others on the following day, and in the rest not many days later, a bubonic swelling (ὕστερον βουβὼν) developed; and this took place not only in the particular part of the body which is called "boubon" (i.e., groin), that is, below the abdomen, but also beside the armpit, and in some cases also beside the ears, and at different points on the thighs.[24]

This descriptive passage is a testament to Procopius' painstaking observations, for it conforms well with modern studies of the plague. Buboes—actually swollen

the Alexandria-Rhodes-Constantinople run. George W. McCoy, "Plague Infection in Rats," in *The Rat and Its Relation to the Public Health* (Washington, D.C.: G.P.O., 1910) 42, pointed out that infected rats could live up to a week before succumbing. Given haphazard communications between shipboard rats—and possibly an infusion of fresh rats if the ship stopped *en route* to Constantinople—there should have been little difficulty in sustaining an epizootic on board until the ship reached its final destination. Once in port, the normally sedentary rats, panicked by the presence of the plague, would abandon ship and spread the disease ashore; see Shrewsbury, p. 19.

17. Procopius, *History of the Wars* 2.22.9.

18. Biraben, 1:13,15; Shrewsbury, p. 3.

19 Pollitzer, p. 327.

20. Shrewsbury, p. 155.

21. Procopius, *History of the Wars* 2.22.15-16.

22. Abram S. Benenson, ed., *Control of Communicable Diseases in Man,* 11th edition (N.Y.: American Public Health Association, 1970) 171.

23. Biraben, 1:10; Pollitzer, p. 412.

24. Procopius, *History of the Wars* 2.22.17.

lymphatic nodes in which the bacilli have been trapped momentarily—have been known to appear on the same day as the fever, although they usually become obvious on the second to fifth days.[25] Because the buboes develop in the lymph node closest to the flea bite, with the victim's legs the most likely target for a flea hopping up from the floor, it is scarcely surprising that 55-70% of initial buboes are on the groin. Axillary buboes, which appear near the armpit, account for about 20% of observed occurrences; cervical buboes, at the back of the neck, appear in 10% of all cases. Other locations are known, and the same patient may have buboes at different sites.[26]

The coma or delirium into which many victims fell is another classical bubonic plague symptom.[27] The reaction of mental intoxication varies with the nature of the patient, but the nervous system is almost invariably affected. Observed reactions have included insomnia, wild delirium, stupor, and varying degrees of loss of control over voluntary muscles, with dulling of the senses.[28] Coma is usually present in the final stage of any fatal variety of plague, and is consistent with the portrayal of bubonic plague presented thus far.

The next section of Procopius' account also deserves reprinting:

> But those who were seized with a delirium suffered from insomnia and were victims of a distorted imagination; for they suspected that men were coming upon them to destroy them, and they would become excited and rush off in flight, crying out at the top of their voices. And those who were attending them were in a state of constant exhaustion and had a most difficult time of it throughout. For this reason everybody pitied them no less than the sufferers, not because they were threatened by the pestilence in going near it (for neither physicians nor other persons were found to contract this malady through contact with the sick or with the dead, for many who were constantly engaged either in burying or in attending those in no way connected with them held out in the performance of this service beyond all expectation, while with many others the disease came on without warning and they died straightway); but they pitied them because of the great hardships which they were undergoing. For when the patients fell from their beds and lay rolling on the floor, they kept putting them back in place, and when they were struggling to rush headlong out of their houses, they would force them back by shoving and pulling against them. And when water chanced to be near, they wished to fall in ... (many) were either overcome by hunger, or threw themselves down from a height.[29]

Part of this account could be taken to support T. H. Hollingsworth's contention that pneumonic plague was common in Constantinople. In either pneumonic plague or in terminal cases of bubonic plague in which the lungs have

25. Shrewsbury, p. 5.

26. Pollitzer, pp. 420-21.

27. Procopius, *History of the Wars* 2.22.19.

28. Pollitzer, pp. 415-16.

29. Procopius, *History of the Wars* 2.22.21-26.

been invaded finally by the bacilli, the victims may experience an "air hunger" that causes delirium and a desire to seek the open air.[30] However, the symptoms of bubonic plague also can produce these effects; Shrewsbury recounts medieval English episodes of patients so driven to distraction by the sheer pain of their swollen buboes that they assaulted their attendants, threw themselves out of windows, sought open water (probably to assuage their high fevers), or ran wildly through the streets,[31] accounts curiously akin to those of Procopius. It is also likely that the nervous intoxication mentioned earlier accounts for much of the erratic behavior of these unfortunate souls.[32] Reconciling the presence of pneumonic plague with the fact that so many of the attendants survived, in spite of their close proximity to the victims, is exceedingly difficult.[33] In pneumonic plague or in cases where a bubonic plague patient has developed plague pneumonia, even a normal speaking voice is enough to transmit germ-laden saliva droplets some two meters, and coughing or sneezing (even more dangerous, since the atomized droplets are likely to drift farther) increases the range to three or four meters.[34] It is hardly likely that attendants wrestling with delirious patients "crying out at the top of their voices" could have avoided inhaling the lethal bacilli had pneumonic plague been really all that common. On the other hand, bubonic plague patients can be handled with impunity as long as they harbor no fleas.[35] Hence it seems likely that those attendants who died after assisting plague victims did so because they, too, fell prey to the rat fleas of the household.

30. Pollitzer, pp. 416, 441.

31. Shrewsbury, p. 5.

32. Hirst, p. 31; Ziegler, p. 27.

33. Indeed, this is the major reason why Russell, "That Earlier Plague," p. 179, and Marks and Beatty, p. 46 and footnote, rejected pneumonic plague as the primary form of the disease. See also J.C.F. Poole and A. J. Holladay, "Thucydides and the Plague of Athens," *Classical Quarterly* n.s. 29 (1979): 299 and note 57.

34. Hirst, pp. 225-26; Pollitzer, p. 15.

35. Blocked fleas of *X. cheopis* prefer rats to man, but will attack humans readily if no rodent hosts are available. Unable to feed successfully because of the plug of *Yersinia pestis* bacilli blocking its stomach and proventriculus, the flea may bite its human target repeatedly until some of the bacilli are regurgitated into the human's blood stream. While plague *per se* does not kill fleas, they cannot feed and soon die of starvation. See Siegfried, pp. 60-1; Shrewsbury, p. 2 (although his theory of plague transmission by fleas feces is denied by Pollitzer, p. 348); and Pollitzer, pp. 351-55. As long as patients harbor no fleas and do not develop secondary plague pneumonia, they may be handled safely without isolation; nor are extraordinary precautions usually required for the burial of plague victims. See Shrewsbury, p. 3; Pollitzer, pp. 597, 610-11.

The medical profession was virtually helpless before the onslaught of the plague. Some physicians (ἰατροί) opened the buboes of the dead, correctly surmising that these swellings were characteristic of the strange disease, and found therein a "carbuncle" (ἄνθρακα, literally a "charcoal, coal").[36] This was, of course, the remains of the swollen lymph node, probably darkened by haemorrhages produced by the toxins given off by the high concentrations of bacteria within the infected organ.[37] Predictions made by physicians about the outcome of the disease in individual patients were as frequently wrong as correct; treatments that seemed to work in one patient failed with another. Unfortunately, Procopius tells modern readers little about the methods of treatment employed by the doctors of his day. He does mention that the bathing of patients was prescribed with indifferent results. Outside of lowering the fever of the sick person, one can scarcely imagine the utility of this treatment. The general helplessness of the medical profession is shown by Procopius' assertion that recovery, if it came about, "was due to no external cause."[38]

Procopius informs his readers that pregnant women were especially vulnerable to the disease, some dying through miscarriage while others perished at term along with their newborn children. At least three mothers survived although their children died, and at least one child lived while its mother did not.[39] While many hypotheses about the preference of plague for certain ages and sexes have been refuted, Procopius' observations were probably correct; neither pregnant women nor their fetuses would have been in sufficiently good physical condition to resist such a lethal illness.[40] Pregnant women may have been at risk *because* they were required to stay at home, unlike other more mobile members of their families. Michael Dols has observed that the likelihood of contracting plague depends entirely on exposure. In medieval Islamic society, women tended to stay home with the domestic animals, and were thus highly likely to encounter rat fleas. It seems likely that similar conditions would have prevailed in Greek

36. Procopius, *History of the Wars* 2.22.29.

37. Pollitzer, pp. 205-06, 422.

38. Procopius, *History of the Wars* 2.22.32-34.

39. Ibid., 2.22.35-36.

40. Biraben, 2:29; Shrewbury, Appendix II, p. 539, states that "Bubonic plague is the deadliest of all *bacterial* diseases to the expectant mother and her unborn child."

Orthodox Constantinople.[41]

In those patients who survived, the primary bubo grew to a tremendous size and then ruptured, discharging pus, relieving the pain of the sufferer, and indicating a likely recovery.[42] Other patients recovered without suppuration; however, in such cases the thigh remained withered.[43] Permanently enlarged and indurated lymph nodes have been observed in modern patients as well.[44] The withering may have been due to tissue destruction by the plague toxins; indeed, "recovered" patients may have permanent damage to limbs and organs.[45] Such convalescents are unable to resume their previous occupations with their old vigor; this undesirable economic side effect of the plague appears to have been largely ignored by historians. Procopius also mentions that some patients never

41. Dols, p. 186. Byzantine women of the middle and upper classes were secluded at home; see Dean A. Miller, *Imperial Constantinople* (New York: John Wiley & Sons, Inc., 1969) 124. Livestock were driven into Constantinople to the butchers' market, and some of these may have been purchased to be housed in "the enclosed patio of some rich house"; see Robert Browning, *Justinian and Theodora* (New York: Praeger, 1971) 55, 61. Refuse and the carcases of animals were discarded outside the gates of Byzantine cities, where they could have attracted rats among other scavengers; see Peter Charanis, "Some Aspects of Daily Life in Byzantium," in his *Social, Economic and Political Life in the Byzantine Empire* (London: Variorum Reprints, 1973), chap. 11, p. 65. Byzantine "neighborhoods" ran the entire social gamut, with the houses of the rich next to shops, offices, and tenements; see Miller, p. 119. Given the necessity for transport within such a major city, it is certainly not hard to believe that stables must have been housed among these structures, and that human dwellers would have had ample exposure to domestic animals.

42. Procopius, *History of the Wars* 2.22.37. On suppuration as a positive sign, see Ziegler, p. 27; Pollitzer, p. 423. Shrewsbury, p. 295, claims that the buboes burst because of secondary infection by pyogenic cocci; this rupture saved the patient's life because "the resulting suppuration destroyed and discharged the plague bacilli." However, it seems far more likely that such pus resulted from the patient's body already having manufactured enough antibodies and white blood cells to turn the tide against the *pestis* invaders.

43. Procopius, *History of the Wars* 2.22.38.

44. Pollitzer, p. 423.

45. In severe cases of plague, the heart tissues haemorrhage, and fatty degeneration may result. The liver may become enlarged and congested, also with fatty degeneration. The kidneys often degenerate, sometimes resulting in true nephritis. See Pollitzer, p. 209. Assuming that the patient does not fall prey to secondary bacterial infection while his buboes are draining, any sudden exertion may precipitate heart failure; ibid., pp. 413, 470. Among other nasty effects are gangrene of the extremities; many of these dire consequences are described in Charles T. Gregg, *Plague! The Shocking Story of a Dread Disease in America Today* (N.Y.: Charles Schribner's Sons, 1978). In spite of its popular treatment and lack of footnotes, the book, written by a Ph.D. in biochemistry currently working at the University of California's Los Alamos Scientific Laboratory, contains some brilliant descriptions of the physiological effects of plague. One hopes that Dr. Gregg intends a more scholarly study of plague in the near future.

quite recovered their speaking ability, either lisping or talking incoherently.[46] Either the plague caused some neurological or motor damage, or perhaps even the brain itself was affected; the high fever associated with plague, or perhaps the pressure created on the brain because of plague-induced edema,[47] could have injured that organ.

So far the evidence of Procopius seems heavily weighted towards the presence of only bubonic plague in Constantinople, but at least part of his account suggests that other varieties may have been present. In some patients, "the body broke out with black pustules about as large as a lentil," such victims dying the same day.[48] This may represent occasional cases of vesicular or carbuncular plague, an unusually lethal but thankfully rare form of the disease.[49] Unless the pustules were open, this variety of plague was unlikely to have been highly contagious. Far more awkward is Procopius' description of many who vomited blood "without visible cause" and immediately died.[50] It is unclear from the context of this passage whether or not these patients had developed buboes before the vomiting of blood killed them; Dols mentions individuals with primary bubonic plague who developed pneumonic complications, including spitting of blood, just before death.[51] Virtually all plague victims, no matter what the original form of their disease, will develop respiratory involvement towards the end,[52] and the inhalation of their coughed or sneezed mucus droplets by those within close range of the dying could cause those exposed to contract primary pneumonic plague.[53]

46. Procopius, *History of the Wars* 2.22.39.

47. Pollitzer, p. 418.

48. Procopius, *History of the Wars* 2.22.30.

49. Pollitzer, pp. 426-27, comments that metastatic carbuncle formation during the course of plague was more common during the Black Death as well as the Plague of London in 1665, but seems to have disappeared since then. The blackish pustules resemble smallpox and are sometimes nicknamed "plague pox" or "plague variola." Hirst, pp. 30-1, treats vesicular plague as a subspecies of bubonic plague; evidently its rarity in modern times has prevented a thorough study of its characteristics. Shrewsbury, p. 5, mentions carbuncles as a skin lesion found in some plague cases, but cautions that this is not positive proof of plague; indeed, the reader of his revisionist work discovers that typhus and smallpox are frequently incriminated as the major or contributing cause of "plague" epidemics. Dols, p. 73, mentions the deadliness of vesicular plague, its similarity to smallpox, and asserts that it may have been significant in early Islamic epidemics. Perhaps *Yersinia pestis* has evolved in a way that makes vesicular plague less likely today; see Poole and Holladay, p. 285.

50. Procopius, *History of the Wars* 2.22.31.

51. Dols, p. 75.

52. Pollitzer, p. 415.

53. Ibid., p. 510.

After an incubation period of one to three days, the new victims may develop a slight cough or insignificant expectoration; fortunately for others, this is a noninfective stage of pneumonic plague, where the patient may be placed in quarantine to spare his neighbors.[54] Thereafter the unfortunate develops a fever of 38-39° C. (100.5-102° F.), while the pulse climbs to 120 beats per minute; as with other forms of plague, this strain upon the heart may result in its ultimate failure. As the multiplying bacilli and their toxins destroy the linings of the lungs, the patient will manifest dyspnea and cyanosis. The trachea and bronchi are noticeably congested, and the mucous membranes of the lungs are covered with a frothy, bloody exudate. Death usually results before three days have elapsed.[55] After the initial 24-hour grace period, the patient's sputum is riddled with bacilli, and its inhalation by others can spread additional cases of pneumonic plague.

Yet in all of Procopius' graphic account of the epidemic at Constantinople, this possible reference to pneumonic plague occupies only one line; evidently the author was far more concerned with the bubonic variety. "Many" (πολλοὶ) may have vomited blood, but this has no quantitative value. Given the ancient and medieval mystique about blood, one might have expected Procopius to have described this distressing symptom at greater length had it been more common.[56] In fact, pneumonic plague is fairly rare, and "it appears capable of developing only under certain special conditions."[57] P.T. Patel, working in an Indian plague hospital in 1927, found that secondary plague pneumonia developed in only 12-13% of some 800 primary bubonic plague patients; even so, such cases did not automatically give rise to additional cases of pneumonic plague.[58] More recent studies have suggested that it is rare for pneumonic complications to appear in 20% of primary bubonic plague patients, and the normal rate is usually less than half of that figure. There is also a "closed" form of pneumonic plague in which the bacilli multiply rapidly under the surface layers of the lung, killing the victim with their toxins before the expectorating stage is reached, thus rendering it relatively noninfectious.[59] Massive outbreaks of pneumonic plague, such as those associated with the later Black Death, may have been caused by a weakening of

54. Ibid., pp. 230, 606.

55. Ibid., pp. 212, 413, 415; Biraben, 1:11-2.

56. Shrewsbury, p. 6.

57. Russell, *Late Ancient and Medieval Population,* p. 40; quote from Sir Macfarlane Burnet, *Natural History of Infectious Disease,* 3rd edition (Cambridge: Cambridge University Press, 1962), 326.

58. Hirst, p. 222.

59. Gregg, pp. 101-02.

constitutional resistance by malnutrition and bad weather.[60] Hence while it appears likely that there were occasional cases of pneumonic plague at Constantinople, there is little reason to assume that it spread through the multitude on a scale remotely approaching that of fourteenth-century Europe. Indeed, the populace of the capital unconsciously took steps that would have minimized the possibility of contracting pneumonic plague. Work of all kinds ceased; everyone remained at home, and "if one did succeed in meeting a man going out, he was carrying one of the dead."[61] Pneumonic plague still could have been spread within the confines of the household, but even then the likelihood of contracting the disease could have been limited by the practice, common to many societies, of keeping the elderly and the young away from the sickbed.[62] In many cases, the very ill seem to have been abandoned to their fate, which would have limited the spread of plague farther.[63] On the other hand, every house would have had rats and fleas, which would explain how bubonic, not pneumonic, plague could have rampaged through Constantinople for four months despite the lack of public contact.

In summation, the predominant form of the plague at Constantinople in 543 A.D. appears to have been bubonic; while some cases of vesicular and pneumonic plague (or else bubonic plague with terminal pneumonic involvement) were observed, the mortality pattern generally would have resembled that of a bubonic plague epidemic.

Part II will be devoted to a discussion of the conclusions that may be drawn about the total number of deaths (and by extension, the size of the population) at Constantinople at the time of the plague.

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60. Pollitzer, p. 509.

61. Procopius, *History of the Wars* 2.23.17-18.

62. Pollitzer, pp. 511-12.

63. Procopius, *History of the Wars* 2.22.20,26.

Schizophrenia: Current Views of Its Psycho-Biology and Arcanum

W. LINFORD REES

SCHIZOPHRENIA is one of the most important and most perplexing disorders in the whole field of medicine. In Britain it has been calculated that the lifetime incidence rate for schizophrenia is between 0.8 and 0.9 percent. This is in accord with estimates made throughout the world and indicates that in Britain there are more than 300,000 people who have had at some time a condition diagnosed as schizophrenia.

Controversy remains regarding fundamental aspects of the disorder, including precise criteria for diagnosis, the role and importance of environmental (extrinsic) and constitutional (intrinsic) factors in its aetiology, its pathogenesis, and indeed whether it is a single homogeneous disorder or a heterogeneous group of disorders. Many hidden secrets await discovery in the arcanum that is schizophrenia. The arcanum of the alchemists was believed to contain the deepest secrets of nature, including a marvelous remedy or panacea and indeed the elixir of life.

Einstein stated that the most beautiful thing we can experience is the mysterious. It is the source of all true art and science. But in Omar Khayyam we read "There was the door to which I found no key, There was the veil through which I might not see." But we can take encouragement from Emerson, who affirms that the secrets of life are not shown except to those with sympathy and kindness.

I

Diagnosis and Classification

The tendency to classify human beings and their diseases is deeply rooted in human nature and perhaps extends back to prehistoric times. It attempts to render some degree of order from the chaos of individual differences. Classification is essential for scientific thinking, research and scientific progress. Kraepelin (1919) distinguished dementia precox (with a chronic progressive deteriorating course) from manic depressive illness (with an attack-like course and recovery between attacks). Bleuler (1950) extended the concept to include a variety of disorders which he called the schizophrenias with characteristic features. Throughout the years the spectrum of disorders included under the designation schizophrenia has become wider and has included conditions like borderline states, latent schizophrenia, schizo-affective disorders, and pseudoneurotic

schizophrenia.

For purposes of research it is essential that diagnostic procedures should be reliable as possible, so that groups compared are as nearly identical as possible. Specified criteria such as used in the World Health Organization International Pilot Study of Schizophrenia and many others have helped to standardize diagnosis and make clinical assessment more precise and reliable. The combination of clinical data, numerical taxonomy, factor analysis, and other statistical techniques, as Shepherd (1976) has stated, increases the reliability of data collection and may even serve to generate more fruitful indices for correlations with biochemical, biological, and psychosocial attributes.

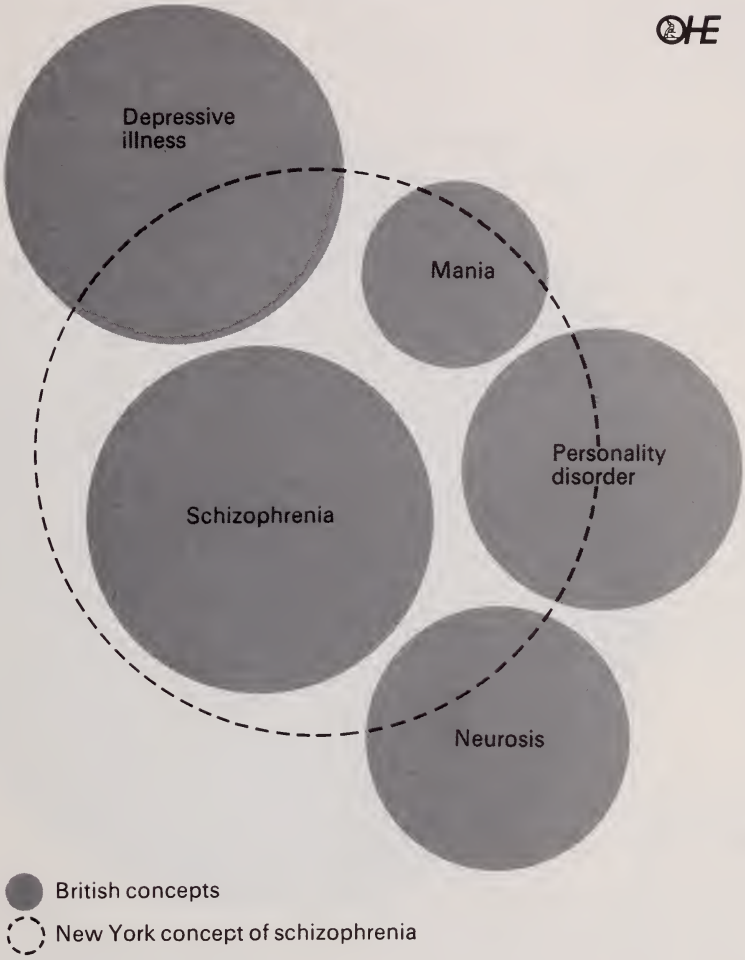
Since the Second World War a number of observers have pointed out that the chances of being diagnosed as a schizophrenic are between two and three times greater in the United States than in Britain. The U.S./U.K. cross-national project was instituted to clarify such observations and was based on the use of a standardized diagnostic interview (the Present State Examination, PSE). The investigation revealed that there was no underlying difference in the incidence of the disease in the two countries, but that American psychiatrists tended to regard as schizophrenic, conditions which in the United Kingdom would be diagnosed as affective disorder as illustrated in Figure 1.

In 1973 the World Health Organization published the results of an outstanding investigation entitled "International Pilot Study of Schizophrenia". Research workers from nine countries collaborated to study 1,200 patients using a special psychiatric interview (the Present State Examination) to elicit symptoms in a standard way leading to a uniform and reliable clinical diagnosis, and also the possibility of diagnosis by a computer programme called Catego. The study revealed that patients with an identical pattern of symptoms could be recognized in all parts of the world including Colombia, Czechoslovakia, Denmark, India, Nigeria, Taiwan, USSR, Britain, and the United States. These findings support the view that schizophrenia is a disease or group of diseases and not merely a label applied to social deviants, as some writers have alleged.

Figure 2 is based on this International Pilot Study on Schizophrenia. It shows a group of nuclear schizophrenics with a 90% chance of being so diagnosed in nine international centers; 23% of probable schizophrenics with a reasonable agreement regarding diagnosis but less reliable than when Schneider's (1959) first rank symptoms are present; and 11% of doubtful schizophrenics. Two centers that showed especial likelihood to diagnose patients in this group were Washington and Moscow.

American psychiatrists were found to be adopting a broader definition of schizophrenia and were including in this category patients who by the Catego programme (which gives weight to Schneiderian [1959] first rank symptoms) were placed in the categories of affective illness. In Moscow patients were misclassifed according to Catego criteria because particular emphasis was placed

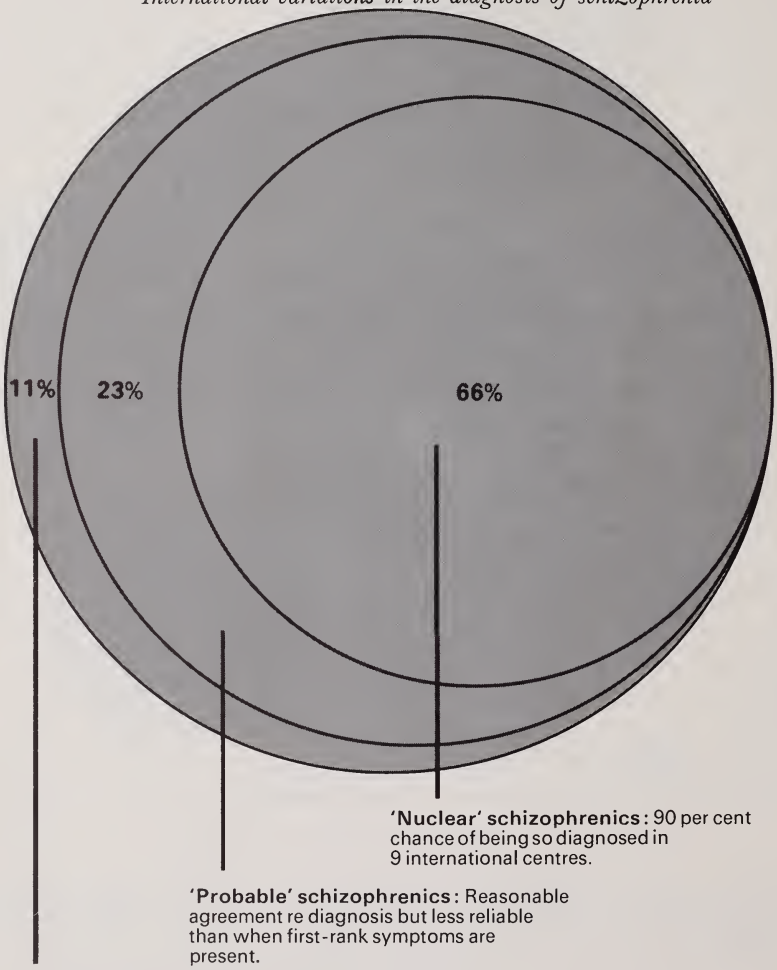
FIG 1 *Terminology of mental disorder*



This is acknowledged in thanks to the Office of Health Economics, London. The original source is *Psychiatric Diagnosis* by J.E. Cooper, R.E. Kendall, R.J. Gurland, L. Sharpe, J.R.M. Copeland, and R. Simon (New York, London: Oxford University Press, 1972).

FIG 2

International variations in the diagnosis of schizophrenia



Source WHO 1973.

on the course of the illness rather than on presenting symptoms.

Recently a follow-up study has been carried out covering a two year period. Wide differences were found in course and outcome. About one third of patients reexamined were totally free from symptoms, whereas one third were still severely affected by schizophrenic symptoms.

It is interesting to note that in three developing countries, Nigeria, India, and Colombia, schizophrenia had a better outcome than in the other six countries. These differences could be due to social factors but might also be due to the possiblity that schizophrenia is not a single disease but a group of disorders with differing biological and perhaps genetic bases whose distribution varies in different ethnic groups. Further research is urgently needed to determine precisely what factors account for these interesting differences in outcome.

Causation

Schizophrenia, like many other illnesses, is of multifactoral aetiology; intrinsic and extrinsic causes interact. Intrinsic causes include constitutional attributes such as body build and genetic predisposition. Extrinsic factors include physical factors such as infections, intoxications, metabolic changes and psychosocial factors including social-cultural influences, psychosocial stresses, and family influences.

Physical Constitution

Kretschmer (1921) suggested that there was a biological affinity between schizophrenia and certain types of physique, particularly the narrow type of body build (asthenic or leptomorphic).

Using factorial methods, Rees (1944) confirmed, in part, this association but found eurymorphic body build more frequently than suggested by Kretschmer's theory. Rees (1957) described relationships between different types of schizophrenia and body build; the leptomorphic physique tended to be associated with an earlier age of onset, and greater withdrawal, apathy, and thought disorder. Schizophrenics of broad (eurymorphic) physique tend to have later onset, better preservation of personality, and better affective relations with the environment. The available evidence suggests that the leptomorphic physique is associated with a deterioration of illness. Studies (Kallman, 1953) showed that concordant monozygotic twins without significant somatotypic differences tended to have similar types of schizophrenia, developing usually at the same age and having similar outcome. When there were differences in physique development in such twins there were usually differences in age of onset as well as differences in severity of schizophrenic symptoms. In monozygotic twins discordant for schizophrenia, it was found that as a rule if one twin remained free from

schizophrenic symptoms a definite difference was found in physical strength and body weight from early childhood consistently in favor of the more resistant twin. Other constitutional attributes reported to be correlated to schizophrenia include cardiovascular characteristics, particularly capillary structure with specific correlations to different types of schizophrenia (Rees, 1973).

In conclusion there is evidence which is suggestive but not conclusive that body build in schizophrenia may be related to age of onset, clinical status, course and prognosis of illness; and that paranoid schizophrenics tend to show constitutional differences compared with simple hebephrenic and catatonic schizophrenics. If further research establishes significant relationships between physique and onset of schizophrenia, its clinical forms, and prognosis, the basis of such relationships may prove to be genetic, the various genes of small effect which determine body build acting as modifiers of the schizophrenic gene or genes (Rees, 1957).

Genetic Aspects

Modern concepts of the role of genetic factors in disease no longer pose the untenable antithesis of either genetic or environmental factors but rather the ways in which genetic predisposition interacts with environmental influences in the production of disease. That genetic factors are important in schizophrenia is now well established.

Family Studies

In the general population the lifetime risk for schizophrenia is about 1%, whereas the rates in the families of schizophrenics including twins and adopted members are much higher. The closer the blood relationship of the relative to the schizophrenic proband the greater the risk of schizophrenia. The lifetime expectancies of schizophrenia for relatives of schizophrenics are summarized as follows:

First Degree Relatives

Parents	6%
Siblings	10%
Children	14%
Second Degree Relatives	3%
Unrelated Persons	1%

When both parents are schizophrenics the risk of schizophrenia in the children is 40%.

Twin Studies

The pooled results of a number of well-controlled twin studies reveal a concordance rate of 45% for monozygotic twins and 15% for dizygotic twins, as illustrated in Figure 3.

The fact that concordance for schizophrenia is only 45% in monozygotic twins indicates the critical importance of environmental factors for those persons who are genetically predisposed to the disorder. The relative importance of environmental factors has been clarified by the study of identical twins reared apart. This reveals that concordance is still significant and that the clinical form of the illness is usually similar. Often the twins develop the illness very closely in time, even though geographically separated.

Studies of Adopted Persons

Studies of adopted and foster children have also thrown light on the relative role of environment and genetic factors in schizophrenia as shown in Figure 4.

Children reared apart from their schizophrenic parents and other biological relatives from infancy, develop schizophrenia at considerably higher rates than do adopted controls with nonschizophrenic biological parents. Children of normal parents who are reared by schizophrenic adoptive parents do not show an increased rate of schizophrenia.

High-Risk Studies

Children of schizophrenic mothers are a high-risk group (Figure 5) compared with children of normal parents. In an 8 year perspective study 10% had become ill, compared with none in the low risk group. The children of the high-risk group who became psychiatrically ill (not necessarily from schizophrenia) had high non-habituating sweat-gland responses with shorter latency of onset and more rapid response recovery then well or low-risk children.

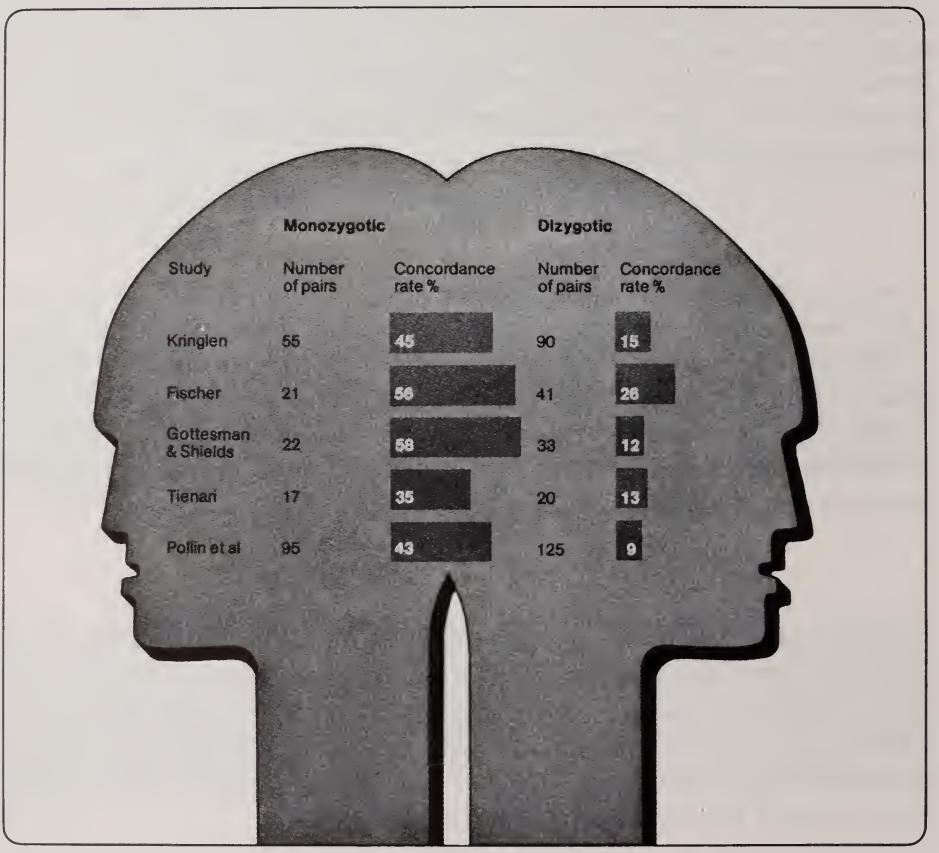
Conclusions on Diagnosis and Classification

Thus about 90% of people with a first-degree relative (a parent, brother, sister, or child) diagnosed as schizophrenic, do not themselves develop the condition. This fact should help dispel some of the alarm that people sometimes feel if a relative has been diagnosed as schizophrenic. It also indicates that models of the single-gene transmission of schizophrenia as a unitary entity are untenable or have to be modified by concepts like that of partial penetrance.

The pathway from genotype to psychiatric symptoms is complex and we do not

FIG 3

Genetics: twin studies

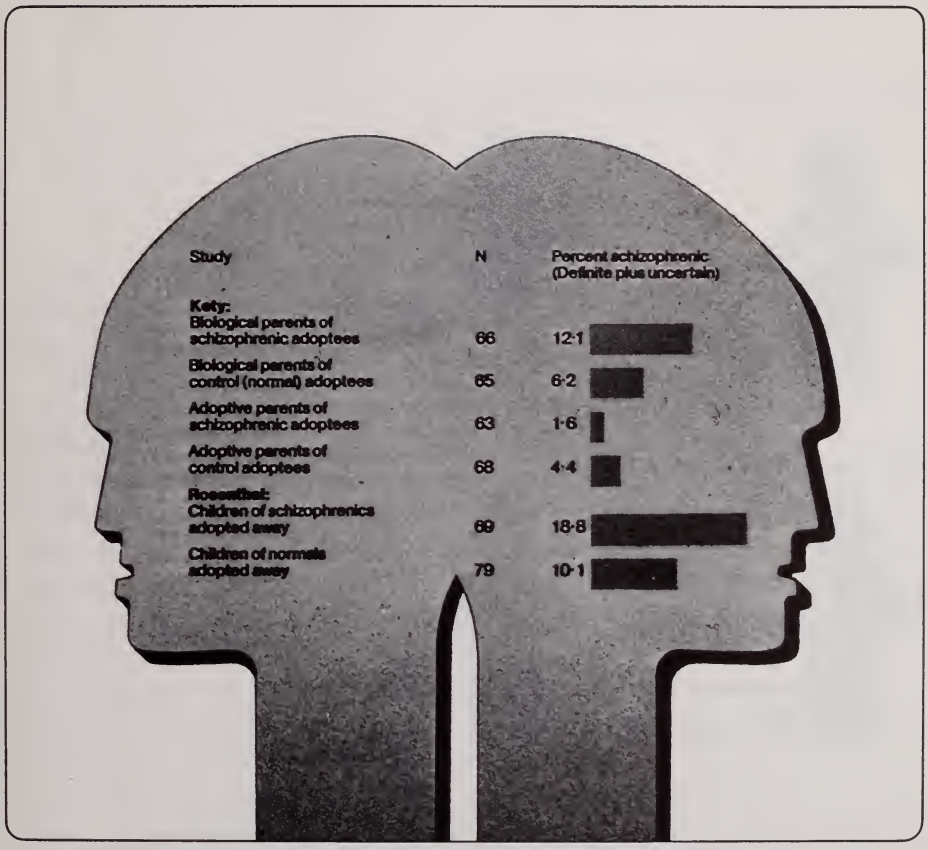


Genetic evidence, if positive, can provide a spur to the biological investigation of schizophrenia because it confirms that gene-linked mechanisms must be involved, even if only in part.

The earlier twin studies yielded high estimates of heritability. More recent studies have been more cautious but concordance rates average about 45% for identical twins and 15% for non-identical pairs. Interest is now shifting to studying the factors which "protect" the non-schizophrenic twin in a discordant pair.

FIG 4

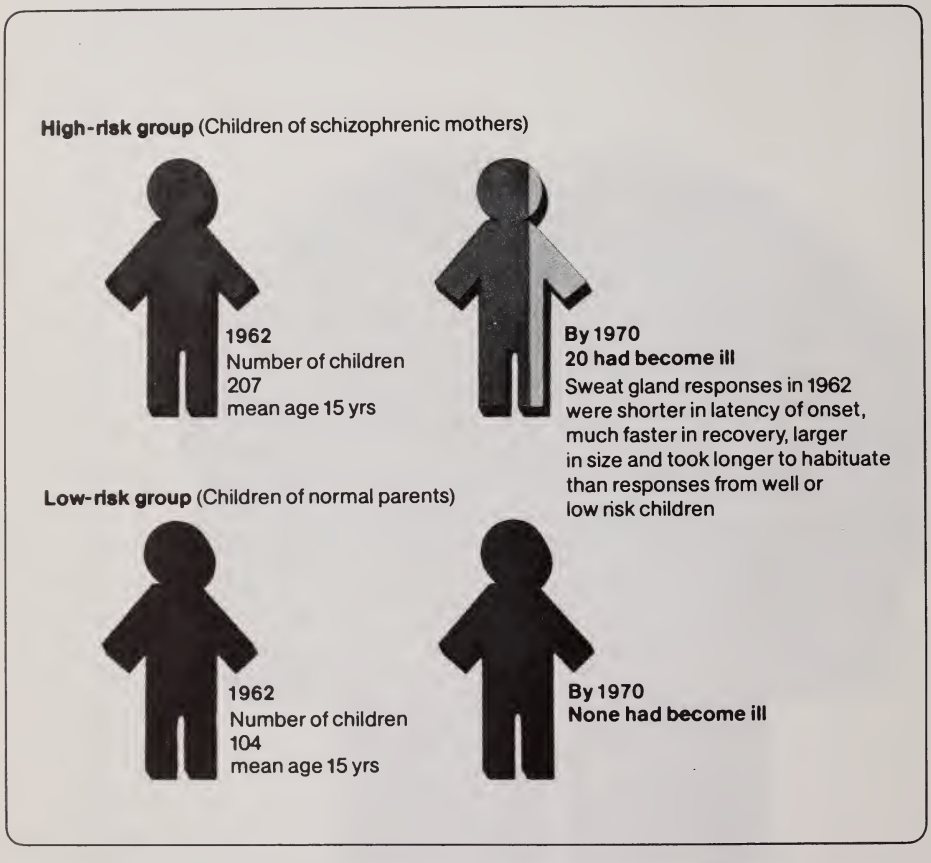
Genetics: adoptee studies



Two major studies (Rosenthal and Kety) in Denmark have examined the incidence of schizophrenia in the children of schizophrenic parents adopted into normal families. As we can see above, biological relationship to a schizophrenic is a more important factor in schizophrenia than a family relationship. Nevertheless, as the high incidence of schizophrenia in the adopted-away children of normals indicates, many other non-genetic factors must operate.

FIG 5

Psychophysiology: high-risk studies



As with many other functions, psychophysiological measures such as palmar sweating, heart-rate and EEG patterns are very variable among schizophrenic patients. Some of the physiological abnormalities reflect perceptual and cognitive dysfunction; for example, "regressed" schizophrenics show impaired reactivity while remitted patients are essentially normal in this respect. Many similar findings can be related to secondary features, in particular the "arousal" and social withdrawal of the patients. One study noted that psychophysiological measures were highest in the most socially withdrawn patients; the implication is that such patients isolate themselves in order to lessen over-arousing external stimuli. Another claim is that schizophrenic patients show psychophysiological evidence of dysfunction in the dominant cerebral hemisphere, an interesting finding which awaits confirmation.

In "high-risk" studies, recordings are taken prospectively from children of schizophrenic mothers and compared with those from children of normal mothers. Both groups of children are followed up and the recordings from those who eventually break down can then be further examined. In Mednick and Schulsinger's Danish study, the recordings of high-risk children who later became psychiatrically ill (not necessarily schizophrenic) had higher non-habituating sweat-gland responsivity and more rapid response recovery than normal.

know how far we are faced in schizophrenia with clinical diversity in genetic unity and how far with genetic diversity in clinical unity.

The mode of inheritance has not been fully clarified; theories include polygenic factors and heterogeneity in genetic predisposition. Shields (1976) has stated that the task ahead, whichever theory one adopts or which may ultimately prove to be valid, is to discover how genotype and environment interact, to search for heterogeneity of one kind or another, and to look for stable biological or other characteristics in relatives which might identify a high risk genotype.

II

Biochemical Aspects

The evidence of a genetic predisposition for schizophrenia has stimulated research into its possible biochemical basis. Genetic factors operate by influencing enzyme systems and ultimately biochemical processes.

Table 1 shows various neurohumoral hypotheses of schizophrenia. It can be seen that there is much evidence against all except the dopamine hypothesis. Further support for this hypothesis is derived from the fact that schizophrenic symptoms may be induced in normal patients by drugs that act on specific transmitters, as for example amphetamines and methylphenedate. Similarly the drugs that alleviate schizophrenic symptoms also act on specific receptors. Carlsson and Lindquist (1963) found that the neuroleptic drugs which alleviate schizophrenic manifestations increase the turnover of dopamine; they put forward the view that this was secondary to blockade of the dopamine receptor. The activation of adenylate cyclase by dopamine in the corpus striatum is inhibited by neuroleptics, this effect being correlated highly with antipsychotic efficacy for a wide range of drugs. Although there is a high correlation between the blockade of dopamine receptors producing extrapyramidal side effects and their antipsychotic effect, this is by no means perfect. Some drugs such as thioridazine and clozepine have little in the way of extrapyramidal side effects but nevertheless are clinically efficacious in schizophrenia. These drugs however have a high anticholinergic potency. In other words they have inherent antiparkinsonian activity. When this is taken into account the relation between antagonism and therapeutic efficacy becomes even more striking.

In the corpus striatum, thioridazine and clozepine have relatively weak effects in the dopaminergic transmissions but this does not occur in the mesolimbic dopamine system (nucleus accumbens), where dopamine blockage correlates well with therapeutic efficacy. Recent study has shown that only the alpha isomer of a thioxanthen neuroleptic, flupenthixol, is effective in

TABLE 1

Neurohumoral Hypotheses of Schizophrenia

Theory	Evidence from postmortem studies		Principal Arguments
	For	Against	
Serotonin deficiency		Serotonin turnover not decreased	LSD psychosis resembles schizophrenia
		Serotonin receptors unchanged	LSD blocks serotonin receptors
Dopamine neurone overactivity		Dopamine turnover not increased	Amphetamine psychosis resembles acute paranoid schizophrenia
			Amphetamines increase dopamine release
Dopamine receptor supersensitivity	Dopamine receptors increased		Antipsychotic drugs block dopamine receptors
Noradrenaline neurone degeneration		Dopamine-B-hydroxylase not reduced	As above
Monamine oxidase deficiency		Monoamine oxidase activity not reduced	Reward processes are mediated by central noradrenergic systems; adhedonia is a core feature of chronic schizophrenia
			Platelet monoamine oxidase activity is reduced in some schizophrenic patients

treatment. This isomer blocks the dopamine receptors, whereas the beta isomer, which is very much less potent as a dopamine antagonist, is no more effective than a placebo.

Crow (1980) has marshalled the evidence which strongly indicates that the antagonism of dopamine receptors—particularly those located within the mesolimbic system, and in particular the subgroup of receptors specifically labelled by butyrophenes—is most probably the critical element in diminishing schizophrenic symptoms. The fact that there is no evidence of increased turnover of dopamine in post-mortem studies of schizophrenic patients, even when they have been on longterm medication, provides no evidence that the dopamine neurones are overactive in schizophrenia. On the other hand approximately 66% of patients with schizophrenia have an increase in the number of dopamine receptors in the brain. This has been shown by special receptor assay techniques. In fact the only change found consistently in the post-mortem studies of the schizophrenic brain is an increase in the number of dopamine receptors. Whereas blockade of receptors occurs rapidly with neuroleptic drugs, the therapeutic effect clinically takes at least two weeks, suggesting that blockade of receptors may be necessary only to allow some other change to occur.

Crow (1980) believes that the syndrome described under Type 1 (Table 2) is associated with the change in dopaminergic transmission. Type 2 he thinks is associated with a defect state and is characterized by negative symptoms such as affective blunting poverty of speech and thought, and is unrelated to dopamine transmission. Type 1 responds very well to the usual neuroleptics. Type 2 is associated with a graver prognosis; the patients do not benefit from most neuroleptics but may respond to drugs such as pimozide, fluspirilene and oxypertin.

Prostaglandin E1 (PGE1)

Horrobin (1980) postulates a deficiency of PGE1 in schizophrenia. He states that B endorphin can inhibit the production of PGE1 from its precursor (dihomogammalinoleic acid, DGLA), whereas melatonin produced by the pineal has the opposite effect. This speculative hypothesis awaits further research for confirmation or refutation.

The Role of Infections and Immunological Factors

For many years there have been hypotheses that infections may underlie some schizophrenic syndromes, but as yet there is no firm evidence incriminating a microbial agent in schizophrenia and immunological studies of schizophrenic patients have not yet revealed abnormalities which might be attributed to

TABLE 2

Two syndromes in Schizophrenia (after Crowe 1980)

Features	Type 1	Type 2
	Positive symptoms	**Negative symptoms**
Symptoms	Hallucinations Delusions Thought disorder	Emotional flattening Poverty of speech and ideas Lack of drive Inertia
Onset	Sudden within 6/12	Gradual usually
Response to neuroleptics	Good	Poor but may respond to Pimozide Fluspiriline or Oxypertin
Prognosis	Good	Poor
Intellectual impairment	Absent	May be present
Pathology	Increased dopamine receptor	Cell loss and structure changes in brain
Clinical diagnostic type	Acute schizophrenia	Chronic schizophrenia and defect state

persistent infection. However, recent work showing that slow virus infections may cause non-inflammatory chronic and progessive degenerative neurological diseases has led to increased speculation that a slow virus may be important in some forms of schizophrenia. Crow et al. (1979) found a virus-like agent (VLA) with a cytopathic effect on cultural cells in the cerebrospinal fluid of 18 of 47 patients with schizophrenia, ten of whom had nuclear schizophrenia. The authors concede that VLA is widely distributed in the community and is pathogenic only in a genetically predisposed subpopulation.

Vartanian (1978) reports interesting work on auto-immune reactions in schizophrenia. He and his co-workers found that schizophrenic patients had antibodies to specific brain proteins and changes in the properties of lymphocytes. The evaluation of this work awaits further research.

The belief that schizophrenia was due to gluten sensitivity has not gained

general acceptance; reports are in conflict.

Neuroendocrine Changes

It is now known that the release of prolactin is controlled by the tuberoinfundibular dopamine system which inhibits its release. The large majority of neuroleptic drugs which are efficacious in the treatment of schizophrenia cause an increase in prolactin levels by blocking the tuberoinfundibular dopaminergic pathway. Other drugs, including some phenothiazines (such as promethazine, which is an antihistamine without any therapeutic effect on schizophrenia), do not cause any increase in release of prolactin; neither does the benzodiazepine series of drugs, which can alleviate anxiety and distress without effect on schizophrenic symptoms.

The study of prolactin secretion is of particular interest in view of the suggestion that dopaminergic transmission may be disturbed in schizophrenia. If the release of dopamine were increased in schizophrenia, one would expect an unusually low level of prolactin secretion, but the work of Meltzer, Sacher and Frantz (1974) and Johnstone et al. (1977) failed to support this.

Secretion of prolactin is a sensitive indicator of dopamine-blocking actions of neuroleptic drugs. In view of the fact that increased secretion of prolactin reaches a ceiling with doses of neuroleptics below the therapeutic level means that measurement of prolactin level is of no value in predicting therapeutic response to medication.

Endorphins

The discovery that the human brain contains receptors which will specifically bind opium led to the belief that these receptors moderate the reception of pain by reacting with a natural brain substance; it is really just a coincidence that they happen to bind the active principle of the poppy which therefore has analgesic properties. These receptors are clearly for substances produced by the brain as endogenous analgesics. Eventually peptides were discovered in the brain which had strong opiate-like analgesic and receptor-binding activities. These were the enkephalins which contain five amino acids.

Subsequently beta endorphin was discovered. Being at least 30 times more potent than enkephalin in its ability to bind opiate receptors, it is a powerful analgesic. At St. Bartholomew's Hospital a valid method for measuring beta endorphin has been developed. It has been demonstrated conclusively that beta endorphin is synthesized in the brain, instead of exclusively in the pituitary as previously supposed. Enkephalin and beta endorphin, like morphine, act on hypothalamic mechanisms which cause the release of growth

hormone and prolactin. The endorphins are undoubtedly important neurotransmitters in the central nervous system. Their discovery has stimulated research on their possible role in the functioning of the central nervous system in health and in disease.

In schizophrenia the role of endorphins has been investigated in a number of different ways. The administration of the opiate antagonist noloxone was reported to produce beneficial effects on schizophrenic symptoms, but this finding has not been confirmed by all workers. The intravenous injection of beta endorphin again has produced variable results. In animals the endorphins produce a syndrome resembling catatonia, which suggests that possibly an excess of endorphins plays a role in schizophrenia. Further, it has been reported that haemodialysis benefits some schizophrenic patients. Finally metenkephalin has been reported to have been increased in the cerebrospinal fluid of schizophrenics during the active phase of illness, and to decrease with neuroleptic treatment. The study of endorphins is undoubtedly of great interest and potential importance, but at present we cannot say with certainty whether it has a significant role in the causation of schizophrenia.

Social and Environmental Factors

A consistent finding in psychiatric epidemiology is the detection of a disproportionate number of schizophrenics in certain districts of large cities. This has been found in many parts of the world, schizophrenics being disproportionately numerous in the lower social classes.

At first it was believed that there was a causal relationship, that is, poor social circumstances either cause schizophrenia or favor its onset in the predisposed by exposing them to social isolation, economic deprivation, poor medical care, and poor education. However, most subsequent evidence has shown that the correlation is due to a drift downward in the social scale as a consequence of the schizophrenic illness.

Current Stress and Family Influences

There is now convincing evidence that stresses can precipitate or exacerbate schizophrenic illnesses. In a carefully controlled study of successive admissions of acute schizophrenia, Brown and Birley (1968) found that schizophrenic patients experience a significantly higher frequency of stressful life events during the three-week period prior to the onset of their symptoms than did a matched group of non-schizophrenic controls. This was true even of independent events which could not have been caused by the patient's illness. Brown et al. (1972) found that the role of stressful life events in triggering the florid onset and reappearance of symptoms operated in those who were predisposed and were experiencing tense

and difficult situations.

Hirsch and Leff (1975) attempted to replicate in Britain some of the results of Lidz et al. (1968) and Singer and Wynne (1976) in the United States. They concluded that although families of schizophrenic patients showed greatly increased levels of conflict, distress and disharmony, there is no clear evidence for attributing a causal role to these processes. These findings show the unfairness of blaming families for the development of schizophrenia and for making scapegoats of and giving unsympathetic treatment of the families of schizophrenics.

However, it is now known that environmental factors relating to the family can influence the course and clinical manifestations of both acute and chronic schizophrenia. For example, Brown et al. (1962,1972) provided convincing evidence that expressed criticism and critical attitudes within the family were often associated with the occurrence of acute relapse. This is a finding of great importance in the management of schizophrenia. Another important finding was that schizophrenics subjected to high levels of critical emotion were the ones who benefited most from neuroleptic drugs in the prevention of psychiatric crises. Vaughn and Leff (1976) confirmed these results independently. They found that 90% of patients diagnosed as suffering from schizophrenia and going from hospital to homes with a high level of expressed emotion (EE) without protection from neuroleptic drugs or controlled levels of face-to-face contact, would have an acute relapse within nine months, whereas of those either on medication or with limited levels of family contact only 50% did so. These findings indicate that schizophrenia is associated with increased vulnerability in which the mechanics controlling the arousal of the subject are influenced excessively by external factors.

Recent work by Leff and Vaughn (1980) showed that factors governing the onset or relapse of schizophrenia were associated with either a high expressed emotion (EE) or with an independent life event which was potentially stressful, whereas in depressive neurosis it was a combination of critical expressed emotion and an independent life event that was correlated with the onset.

Homogeneity versus Heterogeneity in Schizophrenia

As we have seen, the evidence indicates that a multiplicity of causal factors operates in the causation of schizophrenia. These include genetic and constitutional attributes as predisposing causes and a number of environmental factors which act as precipitating causes. At present it is not possible to divide schizophrenia into subgroups on the basis of specific constellations of causative factors.

The spectrum of psychiatric disorders included under the designation of

schizophrenia suggests heterogeneity rather than homogeneity. However, in treating schizophrenics we find that clinically similar patients may show different responses to specific treatment. It is probable that there are many different subtypes of schizophrenia with characteristic genetic, biochemical and constitutional substrates. At present we are unable to delineate such subtypes with certainty apart from the rare form of periodic catatonia studied so effectively by Gjessing.

It is hoped that further research will help to elucidate meaningful subtypes of schizophrenia which will enable the clinician to decide which treatment is likely to be most efficacious and thus result in even greater proportions of recovery than exist at present.

Conclusion

Recent research has begun to elicit some of the deep secrets hidden in the arcanum of schizophrenia. The results are encouraging and should stimulate further intensive research to find the most effective ways of treating and preventing an illness which remains one of the most mysterious in medicine.

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ACKNOWLEDGEMENT

I wish to thank Doctor T.J. Crow and the Editor of the British Medical Journal for permission to include Tables 1 and 2; Messrs. Sandoz for Figures 3, 4, and 5; and The Office of Health Economics for Figures 1 and 2.

A Quack in Court

THOMAS R. FORBES

MEDICAL quackery in its long history has found many guises. Its practitioners have advanced with the times, progressing from the "extraction" by sleight of hand of pebbles from the skulls of victims who had been convinced that they had rocks in the head, a successful ploy of the medieval and Renaissance charlatan, to the solemn administration of electronic "therapy" and dubious vitamin preparations in our own age of enlightenment. Like more respectable trades, quackery had its own specialists, including self-professed astrologers. By the seventeenth century, as Thompson[1] points out, divination from the heavenly bodies, long an essential element in medical diagnosis and treatment by the physician, had become a useful adjunct of medical charlatanism. But it seems that not every astrologer could foretell the hazards that awaited him.

On a December day in 1814 one Joseph Powell was brought before the judge at London's Old Bailey.[2] It was not a new experience. Seven years earlier the court had adjudged Powell

> an incorrigible rogue...for having made use of a certain subtle craft, pretending to have skill in Astrology, to deceive and impose upon James Weston, to tell future events that would happen to him, having been before punished as a rogue and vagabond, and ordered to be imprisoned in the House of Correction one year and to be openly whipped at the carts tail from the end of Mutton-lane to the end of Aylesbury-street....

But Powell was a hardened sinner and now, at the ripe age of 70, he "did offend again in like manner, to deceive and impose upon Benjamin Smith."

The original records of the quack's earlier convictions were produced and read by a clerk. Then the keeper of the New Prison at Clerkenwell identified the prisoner as the same man who had originally been convicted for vagabondage and later, in 1807, had been punished for deceiving James Weston. This of course was long before the introduction of anthropometric systems or fingerprinting as aids in the identification of suspected criminals. Even the court records consisted of little more than listing of the name of the offender, the date of his trial, the alleged crime, and the sentence if guilt was proven in the eyes of the jury.

Benjamin Smith, the victim in the present case, was a shoemaker who lived in Bullen Court in the Strand. Smith had his own troubles—his wife had left him

1. C.J.S. Thompson, *The Quacks of Old London* (New York: Brentano's, 1928), 57, 27.

2. *The Whole Proceedings on the King's Commission of the Peace, Oyer and Terminer, and Goal Delivery for the City of London....* (London: H. Buckler, 1814), Dec., 64-65.

and he wondered if she were coming back. So off he went to the home of the astrologer, not far away at 64 Queen Street in Soho. Powell answered Smith's knock and invited him inside. The shoemaker put his question, and received an answer. Then, Smith testified,

> I gave him two shillings and sixpence after the answers; I paid him. He then took a slate, and drew some figures on the slate, and when he had drawed the figures, he signified I might possibly see my wife on the 1st of November [it was then 13 October]; if I did not see her on that day, he thought I should see her at the end of that month; and if I did not see her at the end of that month, he thought I should never see her again.

Then Powell, an alert man of business, gave Smith a hand bill "to recommend him customers." The bill read as follows.

> *POWELL, late Professor of Astrology, & Physic, Respectfully informs his friends and the public, that he now sells the invaluable articles, viz. a liquid that is a certain cure for the scurvy in the teeth and gums; being only used with a brush it makes the blackest teeth clean and white in a few days; an eyewater which has restored the sight when almost lost; a tincture for curing the torturing pain of the tooth-ach, at two shillings and sixpence per bottle. Also the scurvy, rheumatism, consumptions, old coughs, colds, and various other diseases safely and speadily cured, on very reasonable terms; any commands by letters (post paid) will be punctually attended to at No. 64, Queen-street, Soho, near Greek-street, first doors up one pair of stairs. (No questions asked.)*
>
> *"A Penegeric on the Starry Systom,*
> *"How great the Glorious of the Skies;*
> *"The Sun, the Moon, the stars likewise;*
> *"The frame of Heaven transpend out spread,*
> *"With brilliant beauties spangled;*
> *"Without these orbs past all relate,*
> *"Here's no light, nor life, nor state,*
> *"If they give life and wealth create,*
> *"Then sure they must ordain our fate.*

"The quack," says Thompson, "Has always shown great skill in advertising and recognised it as the mainspring of success."[1] Powell's handbill is an example of such enterprise, combining a fine flight of promised cures with a fervid if not very literary testimonial to astrology. How could an astrologer be wrong? And discretion was assured for sufferers from unmentionable disease—"No questions asked."

Answering a query from Powell's barrister, Smith stated that he had not seen his wife again. The defending counsel tried to get him to say that he had *not* been tricked. Smith may have been less sagacious than his famous prototype Hans Sachs, the cobbler, poet, philosopher, and *Meistersinger* of Nuremberg, but now he was wary.

> *Q.* You were not cheated or defrauded by his words.—*A.* I paid him two shillings and sixpence in money.
>
> *Q.* You paid no intention [*sic*] to what he said, you were not deceived at all.—*A.* I. paid attention to pay him his money; as to belief I cannot say much about it.

The police officer who had arrested Powell at his lodgings offered in evidence two slates and some books found there, together with

> a number of letters with questions in them to be answered; this frame I now produce he called a perpetual motion at the office; it appears to be for the purpose of drawing lines on a slate.

Evidently Powell gave medical consultations by mail as well as in person. Unfortunately, we are told nothing further about the perpetual motion machine; it may have represented another profitable line of business.

Powell spoke shrewdly in his own behalf.

> *Prisoner's Defence.* My lord and gentlemen of the jury, this is a very unjust prosecution. I had for many years dropped the business of astrology; by no means answering any thing, when I did, it was down right distress made me do it, and for want of bread for my family. I have now a wife out of her mind, and a child only nine years old; a twelvemonth ago two children were left upon me by a relation that died, and left his wife in great distress, now they are all in distress together. My poor child came yesterday evening to me, and told me every thing was gone, and yesterday she had only a pennyworth of bread to exist on.

He had answered Smith's questions, he said, only as a favor to an old friend. "I told him I did not pretend to predict anything." He had refused the shoemaker's money, which the latter insisted on leaving. And so on. But the jury found Powell guilty, and he was sentenced to be "Confined 2 years, and fined 1s."

Prosection of medical quacks and empirics at the Old Bailey seems to have been relatively uncommon, although in 1829 Edwin Martin Van Butchell, who like his father, Martin Van Butchell, practiced surgery without benefit of licensure by, or membership in, the Royal College of Surgeons, was haled into court on a charge of manslaughter. One of Edwin Van Butchell's patients had died after gross surgical malpractice.[3] But in the first half of the eighteenth century legal restraints on medical quackery were few.

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3. T.R. Forbes, "Malpractice and Manslaughter: the Case of Edwin Martin Van Butchell," *Conn. Med.* 40 (1976): 323-325.

This publication was supported in part by NIH Grant LM 03266 from the National Library of Medicine.

The Jefferson-Dunglison Grandfather Clock

FREDERICK B. WAGNER, JR.

THROUGH an anonymous donor, Thomas Jefferson University has received a replica of the grandfather clock which through the years has served as a testimonial to the friendship between Jefferson and his personal physician, Robley Dunglison. The story of the clock and its disposition reveals the unusual relation that existed between these two remarkable men and the institutions they served.

In 1824 James Monroe, the fifth president of the United States, was in the third year of his second term. Thomas Jefferson, then 81 years of age, still in full possession of the intellectual energy and humanitarian spirit that characterized his genius, was founding the University of Virginia. Creation of the medical school proved a problem in that the best chairmen in the country were already engaged and Jefferson did not consider it ethical to lure them into a new school in which there was no immediate intention to educate and train physicians. The teaching of medicine was to proceed on historical lines with explanations of its successive theories since the time of Hippocrates for the purpose of affording such information as educated persons would want for the sake of culture. Jefferson as rector also favored obtaining a young man as head of the school. The position was deemed of such importance that the search extended to London, where Francis E. Gilmer, Esq., Jefferson's representative, located a likely prospect in Dr. Robley Dunglison. The opportunity and recipient were a perfect match.

Robley Dunglison was born January 4, 1798, in Keswick, Cumberland, England. His mother possessed remarkable intellectual powers and bestowed great care on the moral training and education of her promising son.

His original preparation was for the mercantile profession; it was intended to send him to the West Indies to manage an opulent estate owned by an uncle. The latter died before the plan could be implemented, and probably from natural proclivity Dunglison switched to the study of medicine. He attended a course of lectures at Edinburgh, one at the École de Médicine in Paris, and several private courses in the same city. He passed the examinations of the Royal College of Surgeons and the Society of Apothecaries in London, and received the M.D. degree in 1823 from the University of Erlangen in Bavaria. This lengthy and rigorous preparation, supplemented by his early writings on various medical and anatomical subjects, showed that he was destined for distinction.

On his return to London in 1823, Dunglison oriented his practice toward obstetrics, was elected physician-accoucheur to the Eastern Dispensary, and announced a course of lectures on "The Principles and Practice of Midwifery" to start in October, 1824. Before the time for delivery of the lectures he accepted the

invitation on behalf of the Board of Visitors of the University of Virginia to fill the chair which comprised instruction in "Anatomy, Surgery, the History of the Progress and Theories of Medicine, Physiology, Materia Medica and Pharmacy." The comprehensive nature of these duties was more likely an attraction than a deterrent, since Dunglison had an unlimited capacity for challenge.

The dominant factor in Dunglison's acceptance was financial. He now had the opportunity to marry his fiancée Harriette Leadam immediately. Otherwise he would have had to postpone the marriage and wait for several years in London. The offer consisted of an annual salary of $1,500, free rent in one of the University pavilions, $50 tuition fee from each student attending only his class, $30 from each student attending his class and only one additional, and $25 from all other students attending multiple classes of which at least one was his. A five-year covenant secured by $5,000 guaranteed the arrangement. This arrangement was an early example of academic tenure. In October, 1824, Dunglison married his lady love, daughter of a practitioner of medicine in London, and sailed for the United States. Owing to numerous delays and a long voyage he did not reach Norfolk, Virginia, until February 10, 1825. He proceeded to Charlottesville, the seat of the University, where he was to reside until 1833. These happy years were enhanced by intimate friendships with Presidents Jefferson and Madison.

The University of Virginia opened on March 7, 1825, with professors of ancient and modern languages, mathematics, and natural philosophy; Dunglison was professor of anatomy and medicine. For two years the School of Medicine had a cultural purpose only, but in 1827 it was broadened. Dr. Dunglison, the original head, was made Professor of Physiology, Theory and Practice of Medicine, Obstetrics, and Medical Jurisprudence. A Professor of Chemistry and Materia Medica was added as well as a Demonstrator of Anatomy and Surgery. The M.D. degree was first conferred in 1826, on four recipients.

On May 17, 1825, scarcely three months after Dunglison's arrival, Jefferson first requested the services of his new medical professor. The complaint was urinary frequency. A diagnosis of stricture of the urethra from an enlarged prostate was made. Dunglison alleviated the condition temporarily by passage of a bougie. Within the next two weeks Dunglison called eight times at Monticello to aid the ailing Jefferson. Mutual confidence and respect quickly developed and broadened into friendship with social visits that included Mrs. Dunglison. Between May 27, 1825 and April 7, 1826 a remarkable series of letters was exchanged by the physician and his patient-friend. These "Jefferson-Dunglison Letters" are among the last that Jefferson wrote to anyone and extend to within three months of his death on July 4, 1826, the fiftieth anniversary of the signing of the Declaration of Independence.

They were first published in full in 1960 by the University of Virginia Press under the editorship of John Morris Dorsey, M.D. They contain a running dialogue in which Jefferson expresses gratitude for his medical services with

threats and protests about not being billed and rebuttals by Dunglison about the honor and privilege of treating the former president and current university rector, with repeated refusal to accept payment. References to remuneration may be found on pages 35, 36, 42, 43, and 45. Nowhere is there mention of a grandfather clock.

Jefferson's financial affairs in his last years were in deficit. On vacating the presidency 15 years earlier he had accumulated debts of $20,000 through an overly generous maintenance of his governmental position. He obtained only temporary relief in 1814 (after the destruction of the Library of Congress by the British) by selling 13,000 volumes of his private book collection to the nation for $23,950. Relatives, invited guests and random strangers filled Monticello, which even then was a tourist attraction. At times beds were made for as many as fifty people, who stayed for days or months drinking his French wines and keeping their horses in his stables. For refuge and solitude he had to construct a second home nearby. The threat of bankruptcy in 1826, the year of his death, stimulated a national subscription of $16,5000, which enabled him to have peace of mind until the end. Nevertheless, he died in debt. A few months afterward his furniture, silver, pictures, and Monticello itself, today a national memorial, had to be sold.

During the last two years of his life Jefferson became more and more oriented to his bodily ills and more and more dependent upon his physician. He learned to pass the bougie himself for urinary relief. He had diarrhea, which became increasingly resistant to medication and probably represented colonic malignancy. Until he met Dunglison, Jefferson had always distrusted physicians, feeling that nature was preferable. Dunglison shared the opinion that a conservative common-sense approach to treatment in letting nature play the major role in cure was correct. Jefferson wrote to Dunglison, "I had therefore made up my mind to trust to her altogether until your arrival gave me better prospects." At first Dunglison made the trips from Charlottesville to Monticello on horseback, but during the last eight days of Jefferson's life, he remained by his patient's side and closed his eyes in death.

Jefferson was aware of Dunglison's admiration for the grandfather clock which stood in his bedroom. This handsome eight-day wind-up timepiece had been made by Thomas Voight of Reading, Pa., who later removed to 44 North 7th Street in Philadelphia. His father, Henry, from whom he learned the trade, was a Dutch-trained clockmaker who also became chief coiner at the first United States Mint. The interior of the clock was marked to indicate the day of the week by the level of the weight. Since Jefferson often isolated himself in the recess of his study and bedroom, sometimes for days at a time, the precise day of the week might readily have escaped him. Hence the device was especially useful. Jefferson's financial plight explains why he could not bequeath the clock directly to Dunglison, but he did instruct his family to procure it for his physician-friend when his furniture would be sold upon death.

Dunglison, unaware of Jefferson's wish, attended the auction with intent to buy the clock. He bid to his limit of $150 but lost to Nicholas P. Trist, an executor of Jefferson's will. Dunglison apologized to Trist for having innocently bid against the family, only to be told that it had been purchased on his behalf. The clock was later presented to Dunglison by Jefferson's daughter, Martha Randolph. The family also gave him the thermometer that Jefferson had used for forty years.

Attending one of the greatest presidents of the United States and serving as faculty head in the School of Medicine of the University of Virginia at the age of 28 was only the infancy of Dunglison's career. He subsequently could claim as patients presidents James Monroe, James Madison, and Andrew Jackson. In May, 1833, he accepted a chair of Materia Medica, Therapeutics, Hygiene, and Medical Jurisprudence at the University of Maryland. In June, 1836, he started his long association with Jefferson Medical College in the chair of Institutes of Medicine expressly created for him. He continued in the famous Jefferson faculty of 1841, having been retained as one of three previous faculty members. With the retirement of Dr. Robert M. Huston in 1854, Dunglison became Dean. He remained in that position for the last 14 years of his professional life, in the course of which he signed his name to several thousand Jefferson diplomas. His encyclopedic intellect and enormous literary effect earned him the epithet "Father of American Physiology." His *Medical Dictionary* went through 23 editions and was a classic for 40 years.

Dunglison was the counterpart in medicine to Samuel D. Gross in surgery. Like Gross, he made translations from the German and French and published many standard works such as *The Practice of Medicine, Human Physiology,* and *General Therapeutics and Materia Medica,* which passed through several editions. He continued to write even beyond his academic retirement after 32 years of distinguished service from the Jefferson Medical College in 1868.

In 1852 Dunglison received a LL.D. degree from Jefferson College at Canonsburg and a similar degree at nearly the same time from Jefferson Medical College. He was vice-president of the Sydenham Society of London, of the Pennsylvania Institution for Instruction of the Blind, and of the American Philosophical Society. In younger days he was a performer on the piano and flute and in later years served as president of the Musical Fund Society. Numerous diplomas and certificates of honorary membership in literary and scientific associations in this country and abroad attest to the high esteem in which he was held. His personal library consisted of more than 4,000 carefully selected expensive volumes, two-thirds of which related to science.

Robley and Harriette Dunglison led a happy married life, blessed with five sons and two daughters. Five children survived. Two sons, Richard J. and Thomas R., became physicians, William L. was a merchant, and J. Robley was editor and reporter of the *Sunday Republic.* Harriette died of heart disease in March, 1853, when Robley was 55. He did not remarry but kept residence with his physician

sons. During the latter part of his life he too suffered from severe cardiovascular disease and died at home, 1116 Girard Avenue, on April 1, 1869, in congestive heart failure.

Robley and Harriette Dunglison are buried in Laurel Hill Cemetery, Philadelphia. The site is marked by a horizontal tombstone with slanting sides and a cross engraved at the head. Harriette's name is inscribed on one side and Robley's on the other, with their years of birth and death.

William Leadam Dunglison, the merchant and importer, inherited the Jefferson clock from his father. It was the former's wish that it be given to the Historical Society of Pennsylvania. Accordingly, on June 18, 1894, his widow wrote to Frederick D. Stone, Esq. bequeathing the clock, which she shipped from South Bethlehem, Pennsylvania. Keeping accurate time, it is on public display in Exhibition Room One with the simple inscription:

Thomas Jefferson Clock
Given to His Doctor
Robley Dunglison
Later Professor at
Jefferson Medical College

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Jefferson Medical College
Thomas Jefferson University
Philadelphia, PA 19107

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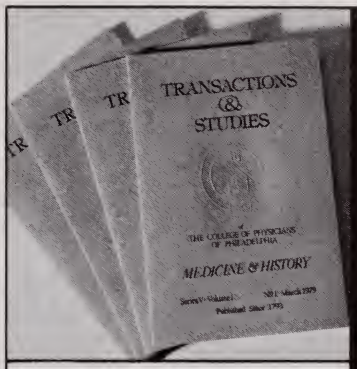

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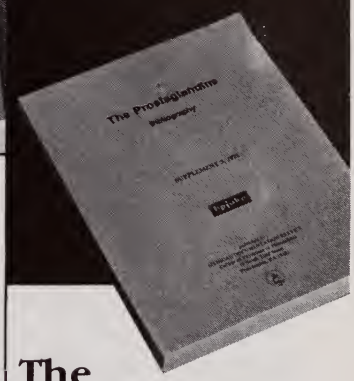

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Science at the Bedside: The Story of Warfield Theobald Longcope

A. McGEHEE HARVEY

ONE of the important tools in the creation of medicine's scientific base was the application of the methodology of the basic sciences to the study of disease in man. This approach and its implementation had a dramatic effect on both medical education and medical practice. The decade and a half from 1900 to 1915 was a period of great importance in the evolution of American clinical science. A small group of men, many of whom had come to know each other well while working in William Henry Welch's laboratories of experimental medicine in New York and Baltimore, were major actors in this drama, which reached its climax in the opening of the hospital of the Rockefeller Institute in 1910 and in the first full-time professorships in clinical departments in Baltimore in 1914. The pioneers were Franklin P. Mall, Simon Flexner, Christian Herter, William Osler, Lewellys Barker, and Samuel Meltzer. Mall, Flexner, and Osler played an important role in shaping the career of Warfield Theobald Longcope.

The one who had the most to do with opening the door through which Longcope had his first view of the world of research was Franklin Paine Mall. Mall entered the University of Michigan School of Medicine at Ann Arbor in 1880. After graduation he went to Germany, although he had at that time no particular interest in research. After working first with Wilhelm His, he entered the laboratory of Carl Ludwig in October 1885. A rare friendship developed between the two. Mall obtained from Ludwig the belief that the time would soon come to put clinical medicine on a full-time university basis. Ludwig felt that this change might come more easily in America in view of the type of organization then existing in the German universities.

Even before the reform of the basic sciences in American medical schools, Mall was looking to the time when the new type of laboratory work pioneered in Germany would make the clinics more scientific. Dr. George E. Vincent recalled discussions led by Mall and Jacques Loeb at the University of Chicago in 1892 and 1893. It was clear that Mall interpreted disease as the price of ignorance. Far better than most of his clinical contemporaries he knew that medicine had to change and that it had to apply the techniques of the basic sciences to the study of disease in man before it could show significant progress. Certainly after he became professor of anatomy in Baltimore in 1893, Mall discussed the matter fully with his staff. The fact that the articulate Lewellys F. Barker was to be his principal spokesman demonstrates one of Mall's characteristics. Because his work was always done quietly, few of the medical community even yet know how great a role Mall played.

In 1899 Barker and Simon Flexner, who were close friends and kept up a voluminous correspondence over many years, led a commission to study the diseases of the Philippine Islands. Upon their return to the United States,

Flexner became professor of pathology at the University of Pennsylvania School of Medicine and director of the Ayer Laboratory. Barker was appointed professor of anatomy at the University of Chicago. In 1903 he was given a leave of absence to work in Munich with the famous German clinician Friedrich von Müller, and during this period he witnessed the vigorous pursuit of research both in the laboratory and in the clinic. In 1902, at a meeting of the Western Alumni of the Johns Hopkins University held in Chicago, Barker gave an address entitled "Medicine and the Universities." He stated with great clarity the doctrines which Ludwig and Mall had quietly advocated for years. Barker pleaded for the reorganization of the clinical departments in medical schools. He believed that they should rank with the other departments of a university and should emphasize research into problems of human disease. He stressed that in order to do this professors would have to be relieved of the necessity of carrying on private practice. Flexner had been offered the directorship of the new Rockefeller Institute for Medical Research. Although extremely busy at this time in his life, he took the time to note the importance of Barker's address and wrote a letter to the editor of *American Medicine* in support of this concept. Thus it is clear that Flexner and Barker saw eye to eye; both believed firmly in what Mall had been urging. This proposal stimulated wide discussion and had an enormous influence on American medicine, at a time when Warfield Theobald Longcope's career was in its most critical stage of development.

Longcope was born in Baltimore on March 29, 1877, the son of George von S. and Ruth Theobald Longcope. He was the oldest in a family of three boys and one girl. His great-great-grandfather was the famous Nathan Smith of Dartmouth and Yale who in the latter part of the eighteenth century treated typhoid fever by hydrotherapy. His mother's brother, Samuel Theobald, was the first professor of ophthalmology at the Johns Hopkins University School of Medicine. His father died just as Warfield was entering medical school. This event left him with a sense of financial responsibility for the family and restricted the extent of his extracurricular activities during a great part of his early medical career. He received his collegiate education at the Johns Hopkins University, then entered the fifth class to be enrolled in the Johns Hopkins University School of Medicine, receiving the M.D. in 1901.[1]

When one views the academic sequence which Longcope followed in relation to the direction and form that academic medicine was beginning to assume in the decade after his graduation, it becomes clear that he unwittingly gave himself ideal preparation for the newly conceived form of full-time medicine for clinical departments, which, as we have seen, was being developed at that time. It is informative to trace Longcope's career following graduation because it not only shows his own development but also reflects the revolution in medical education that occurred during the same period.

In accepting the Kober Medal Award of the Association of American Physicians in 1948, Longcope said:

Photograph of Longcope's class at The Johns Hopkins University School of Medicine taken in 1900 (Longcope is in the center of the back row).

> Whatever the geneticists may say, we must owe much of what we are to our ancestors. If we can blame them for our misdeeds, so must we be grateful to them for the genes that afford us a more acceptable inheritance. Old Nathan Smith of Dartmouth and Yale, must have been richly endowed with medical genes, for there have been doctors in every generation of my family since his time. With this inheritance as a background, what could be more fortunate than to come in contact as a student, first with Mall, the anatomist, whose originality and interest induced many of us to attempt an investigation of something; next with Welch whose encyclopedic knowledge illuminated the subject of pathology with fascinating clarity; and finally with Osler, a born naturalist, who in his ward rounds, with dramatic effect, converted every disease into an active progressive process.[2]

Thus these men provided an early stimulus for his decision to pursue a career in medical research. How he reacted to this stimulus is indicated by the fact that in 1901, the year of his graduation, he published three papers: one on tuberculosis of the aorta; a second on *Micrococcus zymogenes*; and the third on hepatic infarction.

When Longcope left Baltimore at the age of twenty-four to join Flexner at the Ayer Laboratory, he took with him not only the best that this country had to offer in medical education at that time, but also a warm and friendly graciousness in the art of living which Baltimore can teach a receptive student. Longcope always expressed his gratitude to Simon Flexner, who had taught him in medical school and who had a major influence in shaping his career at the Ayer Laboratory. It may seem paradoxical that this great American clinician took no medical internship, but he knew what he was doing. In preparation for a career in internal medicine he was filling his mind with pictures of diseases and with knowledge of morbid processes. By hindsight it seems clear that Longcope, in selecting the position made available in the Ayer Laboratory for his first post-graduate study, was creating a type of clinical activity that was to develop him into the full-time academic medical educator, a type that became almost universal.

This point is worth elaboration. Prior to the construction of the Ayer Laboratory, the clinical laboratory of the Pennsylvania Hospital was described as a "dark and evil smelling corner in the basement, mostly reserved for urine examinations." It is understandable that at that time no clinician had any prime interest in the activities of a laboratory, which served only as a minor accessory to the physical examination of the patient under the umbrella of a well-planned bedside manner. In 1898 the new Ayer Building was completed. It was light and airy, and equipped with new apparatus; and it foretokened a new position for the laboratory in clinical medicine. In time workers there would assume a respected position in promoting the best medical care for patients and in understanding the processes of disease more broadly and deeply.[1]

At the beginning of this era, although the medical profession gave lip service to the value of laboratory activities, Longcope was apparently regarded by his colleagues as a sort of eccentric, who spent time in research when he might have been practicing medicine. Further, the bacteria with which

Longcope concerned himself were still regarded as somewhat "theoretical" in an atmosphere of practical medicine. As a result, he was known in some Philadelphia medical circles as "Bugs" Longcope. The scope of his activities in the Ayer Laboratory included pathology, biochemistry, bacteriology, and serology. He performed the tests, prepared the reagents, and analyzed the results, which he studied for their possible significance in relation to the illness of the patient. In addition to his laboratory activities, Longcope frequently visited the wards and often gave valuable advice, particularly about diagnosis, based on the combined laboratory and clinical findings. In 1909 he received an additional appointment as assistant professor of applied clinical medicine in the University of Pennsylvania. In this position he devoted more time to clinical activities and was able to bring to them the close correlation of bedside clinical observations with pathological findings derived from the autopsy room and the laboratory.

Longcope spoke of these days as follows:

> At that time experimentation in clinical medicine was almost unheard of. Observations made at the bedside with very simple forms of apparatus, inquiries into the etiology of disease, carried out by rather crude bacteriological techniques, and pathological examinations of material obtained at autopsy, formed the bases for clinical study. Venapuncture for bacteriological culture was such an innovation that as a daring novice, trembling with apprehension, I made the first blood cultures ever performed at the Pennsylvania Hospital in Philadelphia. In the Ayer Laboratory of this hospital, however, working under the direction of Simon Flexner, to whom I have constantly been greatly indebted, studies were started in immunology and in the etiology of disease, while later with David Edsall the necessity of employing chemical methods in clinical research became particularly evident, and the value of elaborate methods of diagnosis was emphasized by Theodore Janeway.[2]

In a review of his earliest publications the effects of contact with Welch and Osler become apparent. Although there is a wide diversity in the subjects studied at the beginning, Longcope found himself working in both bacteriology and experimental pathology in the Ayer Laboratory and in these relatively new fields he made contact with observations that were exciting to him, publishing articles on the paracolon bacillus and *Streptococcus mucosus.* One of his earliest continuous efforts was a study of syphilis of the aorta that correlated thoroughly the pathological, etiological, clinical, and therapeutic aspects of this disease. Still another study which emerged from his environment of pathology was on Hodgkin's disease, his first publication on this subject being dated 1903. Later he wrote comprehensive pathologico-clinical monographs for Osler's *Modern Medicine* and *Oxford Medicine.* In addition, over many years, he made intermittent attempts to establish the etiological agent of Hodgkin's disease. Most of his negative results were never published, but in his efforts he surveyed the field of bacteriology and, to some extent, virology. One of the most important events occurred in 1903, when he undertook his first experimental study of bacteriolytic serum complement. This was his initial

experience with antigen-antibody mechanisms, which were to absorb much of his interest throughout his medical career.

Simon Flexner clearly regarded Longcope as a brilliant young man with great potential for an academic career as evidenced by his comments in a letter to Lewellys Barker:

> What you say of the outlook for the Hospital (the proposed Hospital of the Rockefeller Institute) is most gratifying. I should, I think, say to you that in another year or even sooner, if necessary, Longcope will be available for a clinical hospital position. He is, in my opinion, a very unusual man and his work in pathology, etc. at the Ayer Laboratory has meant a great deal to him. He is just the kind of man one should have at the Rockefeller Institute Hospital, but as you will probably get under way earlier I thought I should write to you about him.[6]

In 1904 Longcope replaced Simon Flexner as director of the Ayer Laboratory and served in this capacity until 1911. Then, after ten productive years in Philadelphia, he went to New York as associate professor of medicine at Columbia under T. C. Janeway. At a time when there was much verbal conflict between clinicians and laboratory men, Warfield T. Longcope resolved this conflict by serving in both capacities.

When Longcope finished his term of service at the Pennsylvania Hospital, he emerged as a uniquely trained academician who set a new standard of learning in several different scientific disciplines, which merged in a broader approach to the understanding of disease from the viewpoints of both etiology and pathology. It is not unreasonable to surmise that the authorities at the College of Physicians and Surgeons sensed the arrival of a new era in medicine; this may have been responsible for Longcope's appointment there. To his position at Columbia he brought the multifaceted sources of knowledge by means of which he developed into one of the most distinguished professors of medicine both in this country and abroad.

William C. Stadie, who was for many years director of the John Herr Musser Research Laboratory at the University of Pennsylvania, spoke as follows:

> Warfield Longcope, whom I admired at a distance, was physician-in-chief at the Presbyterian Hospital when I interned there. It was an education to work under him. He taught us the importance of thorough-going history taking, caring physical examinations, and above all the necessity of delving deeply into contemporary literature and medicine. Grand rounds with Longcope were experiences to remember. Days before these bi-weekly occasions, we interns worked diligently in the laboratory and library in preparation for the event. A group of ten to twenty attending physicians, visitors, students, clinical clerks, and interns usually accompanied Longcope on grand rounds. As a rule he had not seen the case before. He listened to the history and made a brief physical examination. His comments on the case from his own experience and from his knowledge of the literature were always illuminating and cogent. In essence, grand rounds were a stimulating battle of wits between Longcope and the intern

Photograph of Warfield T. Longcope taken by G.W. Norris during Longcope's tenure as Director of the Ayer Laboratory at the University of Pennsylvania.

> staff and he diligently tried to find a chink in our armor of tests and facts which we had failed to close. He represented to me the epitomization of the consulting physician —experienced, learned, and always polished.[3]

It was in New York that Dr. Longcope's interest in nephritis developed. In 1913 he published a paper entitled "The Production of Experimental Nephritis by Repeated Protein Injections." After that study he approached the problem, particularly acute hemorrhagic nephritis, through experimentation that involved the notion that nephritis was an altered tissue response to the bacteria (usually hemolytic streptococci) of the acute infection that had preceded the development of the renal disease. An analogue was the manner in which serum sickness appears in the weeks after the therapeutic injection of immune sera.

In his acceptance of the Kober Medal, Longcope recalled the development of his work on nephritis as follows:

> An interest in this subject was aroused many, many years ago. As time went on, it seemed possible if one knew the etiology and pathogenesis of at least one form of nephritis and could follow the course of the disease from its inception to complete recovery or to its fatal termination, there might be a possibility of effecting a cure or of devising a means to arrest its progress before the renal injury became irreparable. Some superficial analogies between serum diseases and acute Bright's disease led to a study with Rackemann, MacKenzie and others of the clinical features and immunological reactions in serum disease. Though these investigations did not throw direct light upon the origin of acute nephritis, they did arouse an interest in the general subject of anaphylaxis and allergy. Crude experiments made at this time showed that inflammatory reactions occurred in the kidneys, involving particularly the glomeruli, when animals sensitized to a specific protein were injected with the same antigen, or indeed, in some animals within three weeks after the injection of a single large dose of antigen. Later the realization that acute infections such as tonsillitis and scarlet fever frequently preceded the onset of acute glomerular nephritis induced us to concentrate attention on this association, particularly since Loehlein long ago had called attention not only to this relationship but to the frequency with which streptococci caused these infections. Dochez's demonstration that scarlet fever was the result of an infection by hemolytic streptococci, combined with Schick's suggestion that many of the complications of scarlet fever could be interpreted as allergic reactions, formed further incentives to this line of work.[2]

When Longcope went to Columbia, Theodore C. Janeway was Bard Professor of Medicine there. In 1914, when full-time clinical chairs were created at The Johns Hopkins University School of Medicine, thus bringing to fruition the dream of Mall, Welch and Barker, Janeway became the first full-time professor of medicine in Baltimore. He was succeeded as Bard Professor by Longcope. While in New York Longcope was fully aware of the scientific progress being made in Germany and he knew the importance of applying scientific methods being developed there for the study of human disease. During the period up until World War I, he attracted to his medical service a number of important young investigators, including John Punnett Peters, who

did excellent work in problems of carbohydrate metabolism and thyroid disease.

Longcope's tenure at Columbia was interrupted by the first World War. In August 1917, four months after this country entered the conflict, he assumed active duty in Washington in the Office of the Surgeon-General of the Army. He also served overseas. He devoted a large part of his military assignment to the two great scourges of 1917-1919, influenza and hemolytic streptococcal infections; both occurred in epidemic proportions and produced high mortality rates. Upon his return to civilian life he again assumed his academic duties in New York, maintaining his positions there until 1921.

In 1922 Longcope returned to Baltimore to become physician-in-chief at The Johns Hopkins Hospital and professor of medicine in the medical school. At this time the future of the full-time system was threatened by long-standing controversy between practicing physicians and academicians.

Walter W. Palmer, an associate professor of medicine at Johns Hopkins, had just accepted the Bard Professorship at the College of Physicians and Surgeons, and the antagonism of the practitioners in Baltimore permitted him to take with him several key members of the full-time faculty of medicine, including Robert Loeb, Dana Atchley, and Alphonse R. Dochez. Thus Longcope had a depleted staff and a department whose esprit-de-corps was in disarray. His skill soon produced positive results and the department improved rapidly in the quality of its staff, in the calibre of its teaching and research, and in the care of its patients.

Longcope continued his work on Bright's disease. He now found that the hemolytic streptococcus caused most of the infections that preceded by seven to twenty-seven days the onset of acute nephritis. He also observed that exacerbation of the infections often caused immediate relapse of the nephritis, that recovery was usually associated with complete healing of the infection and disappearance of the hemolytic streptococci, and that progression to a subacute and chronic state was frequently attended by recurrence of streptococcal infection or by persistence of the organisms. He demonstrated elevation of the anti-streptolysin titer in the blood serum during the acute stage and this elevation often persisted when the disease continued. It became evident, also, that unlike what happened in rheumatic fever, complete recovery resulted in what appeared to be an immunity; hence fresh infections due to the hemolytic streptococcus did not cause exacerbation of the nephritis. Longcope continued to suspect that the mechanism by which streptococci induced the acute renal reaction was of allergic character. He and his co-workers found that killed hemolytic streptococci, as well as non-hemolytic varieties, injected into the renal arteries of rabbits sensitized to these organisms, caused diffuse glomerular nephritis. However, he understood that a more complex process was probably responsible for the acute nephritis that followed tonsillitis or other local hemolytic streptococci infections. Feeling that some light might be thrown on this problem by an inquiry into the immunological processes involved in the formation of the Masugi type of nephritis in rabbits, he and

Calvin Kay undertook to investigate this question. They concluded that in the Masugi nephritis, the lesion is actually caused by an allergic reaction to the duck serum itself and is intensified in the kidneys because the antibodies for kidney present in the duck serum fixed the antigen in this organ.

In Masugi nephritis, ducks are given repeated injections of emulsified rabbit kidney until in vitro tests show that the duck serum contains antibodies against the renal tissue of the rabbit. When this duck serum is injected into rabbits, acute glomerulonephritis ensues. Kay showed that the acute nephritis arose at about the time that antibodies against duck serum appeared in the rabbit. If by various means the formation of antibodies to duck serum were suppressed in the rabbit, nephritis did not appear.

Longcope made many important contributions to the study of nephritis, but at the time he retired from the laboratory the final answers were not yet evident. He spoke as follows:

> Indeed the true satisfaction that comes from the study of clinical medicine is not so much in reaching a final solution, which, after all is a dead end, but in digging to find vistas into wider and wider territories that need to be illuminated by more and more brilliant light. As Stevenson said: 'To travel hopefully is a better thing than to arrive, and the true success is to labour.'[2]

Warfield T. Longcope was in every sense a Renaissance physician. He not only made valuable contributions in the laboratory, but also contributed toward better understanding of disease and its varied clinical manifestations. To his many students his outstanding characteristics were the powers of observation and the clinical discipline which he exhibited at all times in his ward visits and in his handling of patients. However, Longcope was modest about his clinical talents. He tended to emphasize the laboratory work in which he had engaged and to play down his perceptive clinical insight, which contributed just as much to newer medical knowledge or to its better use. He spoke of this in his acceptance of the Kober Medal:

> But all of us who have spent much time in the wards of a hospital are subject to the irresistable temptation of describing rare forms of disease, or of recounting the clinical features presented by a group of patients suffering from a malady that has not previously been clearly defined. Though information gained from this type of simple observations, in which I must confess to have indulged, still has some place in clinical medicine, we all know that the most fertile field of work lies in the investigation of the fundamental processes that form the basis of disease in man. The knowledge that is growing so rapidly and the new methods that are so quickly being made available furnish unlimited scope for the aspirations of the younger generation, and it is therefore to my associates and assistants that I am thankful for my later education.[2]

His ventures into the description of disease were not simple case reports. Two of his classical clinical studies, which in retrospect prove to be important research contributions, may be taken as examples. His outstanding study, "Clinical Features of the Contracted Kidney Due to Pyelonephritis," was

written in collaboration with Walter A. Winkenwerder and was published in *The Johns Hopkins Bulletin* in 1933. The fully developed clinical picture of chronic nephritis caused by bilateral pyelonephritis with shrunken kidneys was described for the first time. There had been nothing about this clinical entity in the textbooks or elsewhere in the English language. It had been recognized in 1913 by Loehlein in his article on "Schrumpfnieren," in which the pyelonephritic type was clearly designated as a special form of secondarily contracted kidney. Longcope and Winkenwerder described nine patients, five of whom had died of uremia and had been examined at autopsy. The condition occurred more often in women than men. The course was often characterized by attacks of pyuria, accompanied by lumbar pain and sometimes by fever. In some patients there were almost no symptoms until uremia suddenly appeared. Evidences of impaired renal function sometimes developed years before death, and occasionally progressed to a remarkable degree without producing serious symptoms. This not uncommon clinical entity was now clearly delineated and its importance was demonstrated for the first time in this country.[4]

A second example of Longcope's clinical descriptive skill was his work on sarcoidosis. The disease usually designated as "the sarcoid of Boeck" was first described and pictured as an infection of the skin by Jonathan Hutchinson some ninety years ago. Hutchinson termed the condition as Mortimer's malady, thus perpetuating the name of his patient. In 1899 Boeck published an account of cases with histological examination of the cutaneous lesions and later added much information concerning the character of the disease and its tendency to involve not only the skin, but also the lymph nodes and the internal organs. After Boeck's paper, the literature on the subject grew, principally in dermatological journals; no attention was paid to the condition by internists.

This situation changed abruptly in 1936 when Longcope, at the meeting of the Association of American Physicians, read a paper, entitled "The Generalized Form of Boeck's Sarcoid." For many years Longcope had been collecting observations on patients affected with this illness. He became interested at first because of the peculiar form of lymph node involvement, a spin-off from his interest in Hodgkin's disease. More recently he had noted eight examples of the generalized form, making a total of seventeen cases. He described patients who revealed all the classical manifestations of the disease. He also noted the miliary collections of epithelioid cells in the lymph nodes, the lesions being arranged in much the same form as tubercles. He pointed out that necroses were rare and that no large areas of caseation were ever observed; this again demonstrated the value of his training at the Ayer Laboratory. A fuller description by Longcope and Pierson entitled, "Boeck's Sarcoid (Sarcoidosis)" appeared in 1937. This contribution contains the fully documented classical description of sarcoidosis. One of Longcope's last papers on sarcoidosis was published in collaboration with David G. Freiman of the Massachusetts General Hospital. This monograph was entitled *A Study of Sarcoidosis Based on a Combined Investigation of 160 Cases Including 30 Autopsies.* Since these classical studies by Longcope, sarcoidosis has become familiar to all practitioners.[4]

Thus, Longcope was one of the generation of "compleat" physicians who could perform skillfully, both in the clinic as a general physician, not just as a limited subspecialist, and in the laboratory as well — an ability which is still important if one is to maintain leadership in the training of young physicians who may ultimately find careers in clinical investigation. Longcope's influence was exerted widely through his papers and addreses. These descriptive articles were never dry repetitions or rearrangements of what had appeared previously. They embodied a wealth of carefully evaluated personal experience and usually contributed significant additions to extant knowledge. He was an insatiable student of these "favorite" diseases. For each of them he maintained a special file in which he collected reprints, clippings, case notes, personal observations, photographs, and odd bits of information. These files were always kept up to date and were not allowed to lapse, even during his long and distressing terminal illness. They even contained clippings and longhand notes made during the last two weeks of his life.[5]

Longcope's influence was also exerted through enthusiastic participation in the affairs of a number of medical and scientific bodies. The long list of national societies and associations to which he belonged will not be recorded here. He was one of the founding fathers of the American Society for Clinical Investigation and took particular interest in the affairs of the Association of American Physicians. He was president of the former in 1919 and of the latter in 1945-46. He was made a member of the Board of Scientific Directors of the Rockefeller Institute in 1934, became its president in 1939, and continued to take an active interest in its affairs after his retirement from the faculty in Baltimore in 1946. Longcope was a member of the National Academy of Sciences and an honorary fellow of the Royal College of Physicians of Great Britain. He was awarded honorary degrees by several universities, including his alma mater, and was awarded the Bronze Medal of the American Roentgen Ray Society.[5] With Warfield Longcope's death on April 23, 1953 at his home in Lee, Massachusetts, American medicine lost one of its pioneer clinical scientists— an important role-model in an era of Renaissance physicians that is rapidly coming to a close.

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The Identity of the Plague of Justinian [Part II]

TIMOTHY L. BRATTON

IN addition to describing the bubonic plague epidemic at Constantinople, Procopius also attempted to estimate how many people died in the capital from the disease. He claimed that at the peak of the epidemic over 10,000 Byzantines were dying daily.[64] In his *Anekdota (Secret History)* Procopius suggested that the morbidity rate (percentage of deaths of those who fell sick) of the plague was about 50%.[65] John of Ephesus, another contemporary if less trustworthy historian, claimed that up to 16,000 corpses were removed daily, and that the total number of deaths may have been as high as 300,000 residents.[66]

As reliable as Procopius may have been in describing other aspects of the plague, there are good reasons for regarding his statistics as hopelessly exaggerated. The first criticism, simply, is where did he derive his daily death totals? As the number of corpses mounted, normal burial procedures broke down, and the unhappy Byzantines were forced into throwing their dead into the open tombs of others, mass trenches, piles by the seashore in hopes that the bodies would be carried off for disposal in ships, and even in the fortified towers in Sycae.[67] Attempting to compile a central registry of deaths would have been virtually impossible under the circumstances. Nor is it likely that Procopius could have reconstructed the death tallies from an examination of the church records of Constantinople, assuming that such records were kept; as the deaths mounted, "all the customary rites of burial were overlooked", probably including church services as well.[68] Perhaps, after the plague had passed, one might have been able to estimate the loss in population from the reduction in collected taxes, but as Procopius was unlikely to have had access to such records and provides nowhere the source of his statistics, one must conclude that his citation of numbers is purely impressionistic.

64. Procopius, *History of the Wars* 2.23.2.

65. Procopius, *Secret History (Anekdota)* 18.43.

66. As cited in James B. Bury, *History of the Later Roman Empire from the Death of Theodosius I to the Death of Justinian* (N.Y.: Dover Publications, 1958) 2:64-5.

67. Procopius, *History of the Wars* 2.23.3,9-10,12.

68. ibid., 2.23.12.

In the second place, the Byzantine method of arithmetic, which used the letters of the Greek alphabet and diacritical marks to represent numbers, was unwieldy and not particularly suited for dealing with large numbers, a problem associated with Latin numerals as well. Anna Comnena, who certainly was an eyewitness to the arrival of the Crusading army of Peter the Hermit before Constantinople in 1096, estimated his army at 80,000 infantry and 100,000 horsemen.[69] However, Western sources suggest that Peter's army had only between 20,000 to 40,000 followers, and that most of these were non-combatants.[70] Given this four-fold inflation of figures, one may well agree with Steven Runciman that "Every medieval historian, whatever his race, invariably indulges in wild and picturesque exaggeration whenever he has to estimate numbers that cannot easily be counted."[71] Procopius, awed by the magnitude of the plague, may well have distorted the numbers of its victims.

Finally, in the passage cited earlier from Procopius' *Anekdota*, his claim that the plague carried off half the survivors of earlier disasters is suspect. It follows a lengthy section in which Procopius described catastrophes "for which Justinian as the reigning emperor must bear the responsibility".[72] Here the *Anekdota* has "a paranoid style to it which should make the reader wary of putting too much trust in it".[73]

The estimation of the population of Constantinople during Justinian's reign is an exceedingly complex question that would require another article in itself. However, methods involving population densities within a city appear safer than other hypotheses, and such an approach will be attempted here. The original city of Byzantium, rebuilt by the Roman emperor Septimius Severus in the early third century, occupied some 200 hectares (1 hectare = 10,000 square meters, or about 2.47 acres). When Constantine the Great established his capital there in 330 A.D., he built new walls to protect future expansion that enclosed some 700 hectares. Finally, the emperor Theodosius II gave the city its essentially medieval shape and area by beginning his great walls in 412-13 A.D., which enclosed 1,400 hectares.[74]

Poorer inhabitants of the city lived in the *domus*, a multi-story tenement house often attached to the larger home of a wealthy landlord. The density of

69. Anna Comnena, *Alexiad* 10.6, trans. E.R.A. Sewter (Baltimore: Penguin, 1969), p. 311.

70. Steven Runciman, *A History of the Crusades* (1951; repr., N.Y.: Harper Torchbooks, 1964) 1:340.

71. ibid., 1:336.

72. Procopius, *Anekdota* 18.42.

73. Evans, *Procopius*, p. 87.

74. Gilbert Dagron, *Naissance d'une capitale; Constantinople et ses institutions de 330 à 451*, Bibliothèque Byzantine, Étude 7 (Paris: Presses Universitaires de France, 1974) 523-25.

the population, packed into such dwellings, was heaviest in the oldest sections of the city; the *Notitia Urbis Constantinopolitanae*, which may date from the middle of the fourth century, indicates that 3,522 out of 4,388 (68%) of these *domus*-complexes were located on only 375 hectares of the entire city.[75] The area between the Constantinian and Theodosian Walls never seems to have been densely populated, and even in the older sections of the city much space was consumed by palaces, public places, churches, storehouses, and governmental structures rather than by private residences.[76]

The original city of Byzantium probably had a comfortable density of about 150 people per hectare, for a total population of 30,000 inhabitants.[77] David Jacoby has assumed that by the end of Constantine's reign (337 A.D.), the density of the old city was 150 people per hectare while the density of the new Constantinian city was only 100 people per hectare, for a total population of about 80,000 inhabitants.[78] By about 395 A.D., the mean density of the two districts of the city may have been about 200 people per hectare, with a population as high as 150,000 inhabitants.[79] When Theodosius II died in 450 A.D., the density of the oldest section had climbed to perhaps 250 people per hectare, that of the Constantinian city was approximately 200 people per hectare, and that of the predominantly rural district between the Constantinian and Theodosian walls was only about 40 people per hectare. The total population would have been about 190,000 inhabitants. By Justinian's reign, the city, especially in the oldest districts, must have been comparitively crowded, or else conditions would not have been so optimal for the spread of the plague. Jacoby assumes that the density of the original Byzantium, because of multi-story tenements, could have been as high as 500 people per hectare, that of the Constantinian city perhaps 450 people per hectare, and that of the region out to the Theodosian Wall perhaps 50 per hectare, for a total population of 360,000 inhabitants.[80]

75. John L. Teall, "The Grain Supply of the Byzantine Empire, 330-1025," *Dumbarton Oaks Papers*, No. 13 (1959), p. 134.

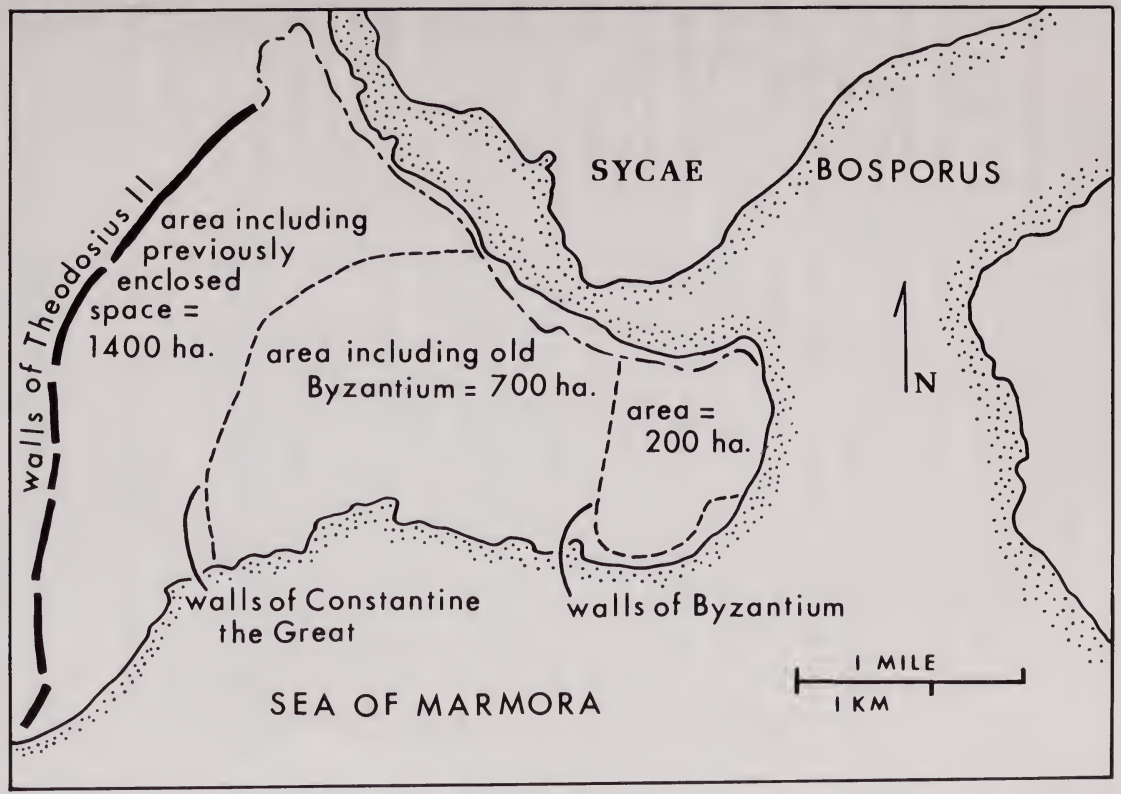
76. David Jacoby, "La population de Constantinople à l'époque byzantine: un problème de démographie urbaine," *Byzantion* 31 (1961):97-9.

77. ibid., pp. 106-07; Dagron, pp. 524-25.

78. Jacoby, pp. 106-08; I do not include the figures for the adjoining suburbs of Sycae-Galata.

79. Dagron, pp. 524-25, thinks that a population of up to 150,000 inhabitants could have been reached as early as 380 A.D., and was certainly surpassed by 410 A.D. For purposes of calculation, I have assumed that this population was attained by the mean date of 395 A.D.

80. Jacoby, pp. 106-08.



The Walls of Constantinople.

After a map in John W. Barker, *Justinian and the Later Roman Empire* (Madison, Wisconsin: University of Wisconsin Press, 1966) 180; map illustration by Susan Kaplan.

Jacoby's density-figures, while corresponding well on the lower scale to known densities of other medieval cities, are probably too generous on the upper end. Medieval Florence, just before the Black Death, was regarded as an exceptionally dense city, and yet never exceeded 400 people per hectare. Jacoby admits that the heavy use of wood in Byzantine architecture precluded many structures over three stories in height.[81] In its love of space-consuming parks and public places, Constantinople, well before the coming of Islam, presented "the characteristic trait of an oriental city"[82], quite unlike the more compact, crowded cities of the west. While an increase of 0.69% per year of the population of Constantinople from 450 to 543 A.D., fueled mainly by immigration, could have resulted in 360,000 Byzantines by the latter year, linear regression and trend line analysis of the data for 337, 395, and 450 A.D. indicates that the probable population of Constantinople in 543 A.D. ought to have been about 288,300 inhabitants. This could have been achieved with a growth rate of only 0.45% per year from 450 A.D. to 543 A.D., and is certainly within the correct order of magnitude. Turkish Istanbul of 1927, which still contained wooden houses similar to those of the Byzantines, held 245,000 people.[83] Even so, these population estimates are optimistic (the proposed estimate of 288,300 Byzantines, for example, would work out to an average of 206 people per hectare within the city, rather crowded by western standards); given a preference for more open spaces by the Byzantines and smaller apartment complexes, the population could have been considerably less.

One thing is clear; estimates that hundreds of thousands of the inhabitants of Constantinople perished from the plague cannot be taken seriously. While Hollingsworth's contention that pneumonic plague predominated at Constantinople must be rejected, that author does provide a mathematical procedure for estimating the characteristics of a bubonic plague epidemic. Procopius said that the plague lasted four months at Byzantium; however, "its greatest virulence lasted about three".[84] Taking Procopius' statement at face value, the effective duration of the plague was about 13 weeks. According to Hollingsworth's schema, a bubonic plague epidemic lasting 13 weeks suggests an intensity of 40% — that is, about two out of every five citizens would have contracted the disease — and of those infected, about half would have died.[85] Given an estimated population of 288,300 inhabitants, about 115,320 would have contracted plague, and 57,660 would have died. Procopius' account of deaths at the peak of the epidemic was off by a factor of 10; the likely peak of daily deaths, again using Hollingsworth's tables, would have been

81. ibid., pp. 102, 105.

82. Dagron, p. 528.

83. Jacoby, p. 104.

84. Procopius, *History of the Wars* 2.23.1.

nearly 1,230 fatalities per day. While this would have represented less than half a percent of the total population of the city, one can see how several days of deaths at such an elevated level would have put a severe burden on the sanitary authorities of the city, and would have generated an aura of gloom that caused the effects of the disease to be exaggerated in subsequent chronicles.

Thus the bubonic plague killed about 20% of the population of Constantinople — a reasonable figure that conforms nicely to what is known for another major European capital.[86] Nonetheless, the epidemic, which spread throughout the entire Mediterranean, effectively halted Justinian's plans for reconquest and seriously weakened his empire. The losses of population lessened the taxes and services available to the Byzantine government. Procopius blamed Justinian's jealousy of the general Belisarius for the lack of troops needed to end the Italian campaign against the Ostrogoths successfully, but modern historians have come to believe that Justinian, after the onset of the plague, simply lacked the manpower and financial resources to send adequate aid to the theater of war.[87] The western barbarians also suffered losses from plague, but it is a curiosity of history that highly organized and sophisticated empires are hurt more by manpower losses than more disorganized, primitive states. Whereas a barbarian warrior might pack away some dried meat and carry his personal spear, sword and shield into battle, expecting to live off the land if need be, the Byzantine soldier required the labor of many people to keep him in the field — armorers, paymasters, farmers, and the like. Not only had many of these vital cogs in Byzantine society passed away with the plague, but those who survived an attack of the disease often suffered permanent physical and even mental damage for the remainder of their lives. Not only the economic vitality of the empire, but its intellectual life as well may have suffered; bold intellectual speculation and a sense of self-confidence may have given way to a mood of fatalism, inadequacy, and a predisposition towards blind

85. Hollingsworth, pp. 365-67. His tables, in turn, are derived from Norman T.J. Bailey, *The Mathematical Theory of Epidemics* (London: Charles Griffin & Co., Ltd., 1957), esp. p. 28, Table 4.1. An even more ambitious attempt to analyze the mathematical properties of plague epidemics can be found in John Brownlee, "Certain Aspects of the Theory of Epidemiology in Special Relation to Plague," *Proceedings of the Royal Society of Medicine* 11, pt. 2 (1918) *[Section of Epidemiology and State Medicine]*:85-127. Unfortunately Brownlee intended this article for his fellow epidemiologists, neglecting to give the values of variables in his equations on the assumption that his contemporaries already knew them; in consequence, the article is nearly indecipherable for most modern readers.

86. Shrewsbury, p. 487, tabulating the losses in the London plague epidemics of 1563, 1593, 1603, 1625, and 1665, notes that in only the epidemic of 1563 did the deaths exceed 20% of the total population; the mean death rate for all five epidemics would have been about 17.5%.

87. John L. Teall, "The Barbarians in Justinian's Armies," *Speculum* 40(1965): esp. pp. 302, 314-20.

religious faith as disasters beset the empire.[88] The wars of Justinian continued, but without a surplus reservoir of manpower; the survivors were hard pressed to pay the heavy taxes.[89] By 559 A.D., possibly only 150,000 Byzantine soldiers were guarding the increasingly fragile frontiers manned in pre-plague times by perhaps 645,000 men.[90] Worse yet, both Byzantium and Persia, the two superpowers of the Middle East, were weakened by the plague and their internecine warfare; when the followers of the Prophet Muhammed burst from the Arabian desert, exhausted Persia collapsed entirely, while Byzantium survived only after losing much of its empire.

One must not suggest that the plague, and *only* the plague, was responsible for all the ills of the post-Justinianic Empire. But the pestilence drastically changed the forces with which Justinian and his immediate successors had to reckon, and it was his tragedy that, instead of retrenching, he pursued his dreams of reconquest, seriously weakening his empire in the process, when Byzantium no longer had the resources to do so. That Western Europe was allowed to develop on its own, free from Imperial interference, to create many of the attitudes and institutions which are present in society to this day, may have been largely attributable to the foiling of Justinian's ambitions by the plague bacillus.

Francis Clark Wood Institute
Transactions & Studies of The College of Physicians of Philadelphia

88. Russell, "That Earlier Plague," pp. 181-82.

89. Russell, *Late Ancient and Medieval Population*, p. 140.

90. Teall, "The Barbarians in Justinian's Armies," p. 320.

Psychiatry, Medicine's Erring Sibling Returns: A History and a Prophecy*

FRANCIS J. BRACELAND

I AM greatly honored by the invitation to present this first Kenneth E. Appel Memorial Lecture. The honor delights me, the responsibility concerns me.

There was not much psychiatry discussed here in early years — in fact, there was not too much psychiatry to discuss. Philadelphia had been the locus of psychiatry's start in this country, for it had the Pennsylvania Hospital and its ward for the mentally ill, established by Benjamin Rush. He was called the father of our discipline and his textbook was the first textbook of psychiatry ever published. These, together with Friends Hospital, marked the first stirrings of interest in the mentally ill, who for the most part were being kept in cellars, garrets, poorhouses, and jails. In 1844 the Jones Hotel and the Kirkbride mansion were hosts to the founding fathers of our official association — the thirteen men who Dr. Earl D. Bond said would stand out in any society. In the beginning the group called itself the Association of Medical Superintendents of American Institutions for the Insane. In 1892 it became the American Medico-Psychological Association and in 1921 the American Psychiatric Association.

Dr. Silas Weir Mitchell, a famous physician, neurologist, and writer, lived here in Philadelphia. In 1894 at the golden anniversary meeting of the American Medico-Psychological Association he chastised the physicians by reading to them a catalogue of their deficiencies and their lost opportunities. In the late nineteen twenties and early nineteen thirties, evidence of modern psychiatry began to appear in this city under the direction of Drs. Earl D. Bond, Edward A. Strecker, and Kenneth E. Appel. In that environment I began in 1932 as an Assistant Physician at the Pennsylvania Hospital for Mental Disease at 44th and Market Streets. I intended to stay there only three months in order to learn about emotional accompaniments of physical disease but that was forty-eight years ago. I remained there longer, as did a sizeable number of young physicians who eventually went on to occupy professional chairs in universities and to head hospitals. If ever there is a psychiatric Parthenon frieze, a number of those older Philadelphians could claim space upon it.

Although I revered Kenneth Appel, I shall not eulogize him here — that has been done especially well by Drs. Daniel Blain,[1] Bernard Alpers and the late beloved Manuel Pearson, who has left us and has gone to join Kenneth. I do not eulogize Kenneth Appel here but I shall keep in mind the fact that this is a memorial lecture in his honor and I shall always remember his goodness and compassion.

* The first Kenneth E. Appel Memorial Lecture, delivered at the College of Physicians of Philadelphia on January 7, 1981.

I am concerned about my title lest it sound presumptuous, for no one can foretell with certainty the movements of a medical specialty or its destination. Forty years ago, Sir Charles Sherrington wrote, "The onward stream of scientific thought, although unhalting yet so twists and eddies that the direction of its general trend may not at a given moment be plain to read."[2] Perhaps it would have been more modest to title my offering "the Erring Sibling is Returning". I believe that it is returning. In nautical parlance it has cleared quarantine and is ready to dock.

Have no doubt about the errant propensities. Psychiatry had its origins and its early years in medicine. We shall here examine why it went away. Like most prodigals it was chasing a will-o-the-wisp, but unlike some it did not waste too much substance, for it had little substance to waste. Now as it moves back it is far wiser than before. Though challenged repeatedly and severely, it has acquired status and may even bring back something important to the medical hearth it deserted. My interest here is simply to present to you the observations of a participant in the psychiatric scene for nearly half a century as clinician, teacher, and chronic office holder in the Association, in addition to being editor of its official journal and senior on its *Yearbook.* I have watched from various vantage points as modern psychiatry has developed.

I was encouraged to address you when I read that Socrates told Cephalus (*Rep.* 328E) that he liked to talk to old men, for they have been on a voyage that he would have to go and he could ask if the way was rough or smooth. So if Socrates could listen to old men, I hope that you might also be willing, and my task then is to talk and yours to listen and I pray that you will not get through before I do.

Obviously this is not the time or place to delineate psychiatry's tangled history for you. I can only give an overview, touching upon the main thesis in order to give you some idea as to why psychiatry separated and why it seems to be returning, and to explain why it should want to return to its ancestral home. Also, what can it bring with it when it does return? Finally, I shall suggest why general medicine should welcome it.

In Elizabethan times the term "psychiatry" was not known. There were disturbed people in profusion, as there always had been and always will be. Some were considered proper subjects for the physician. Those thought to be possessed were reserved for the clergy. Some, I fear, were reserved for the hangman, as they have been at various times in history.

In 1525, Paracelsus[3] had written a book entitled, *On the Diseases that Deprive Man of His Reason*, but the word "psychiatry" cannot be traced back further than 1801 to the time of Phillipe Pinel, who is important to us because of his humane approach to mental patients in the Bicêtre and Salpetrière in Paris. The term "psychiatry" did not receive general prominence, however, until the end of World War I.

Weiner[4] says of Pinel that at the age of 48, and virtually unknown, he was catapulted into the post of Physician in Chief of the Bicêtre Hospital. This happened during the French Revolution. Pinel perfected his philosophy of

medicine, a philosophy fundamental to modern psychiatry at the high tide of the Enlightenment. Had it not been for the French Revolution, Weiner says, Pinel would have died unknown. Thus our lineage is not of the noblest; born in a madhouse during the revolution and sired by an unknown, we shall never be found in Burke's *Peerage.* The important thing is that our forebears were physicians and we were born and nurtured in the medical discipline. I accent this fact for later reference, for our role as physicians is being challenged.

In the second half of the nineteenth century there was a revolution in the care of the mentally ill caused by the convergence of social, medical and economic influences. Dorothy Dix was actively encouraging legislators to open state mental hospitals. A public hospital had been opened in Williamsburg, Virginia in 1773 and a number of private hospitals were founded beginning in the early years of the nineteenth century. The treatment then in vogue was the so-called moral treatment, which consisted of kindness and care and the use of whatever medication was available (none of it specific) and the accentuation of the remaining normal aspects of the psychotic patient's personality. Moral treatment was lost when great hordes of immigrants, many of them seriously ill, flooded the hospitals on the East coast in the 1840s and 1850s.

The present narrative begins in the 1930s, when almost all the psychiatry extant was practiced in mental hospitals, which were isolated from the rest of medicine. Many of the small hospitals were well run, but a description of their workings would be only indirectly related to our purpose. The Rockefeller Foundation entered into this situation around 1934 in Philadelphia through the farsightedness of Alan Gregg. He was the Foundation's medical director, a physician, a cultured gentleman, and a cosmopolite in the best sense of the word. He saw, as very few others did, possibilities for psychiatry in the future and he had hopes that it might develop into an important part of medicine. He persuaded the Rockefeller Foundation to endow teaching programs in psychiatry in several universities and various hospitals, and to award fellowships to promising young men.

Psychoanalysis had been imported into the United States, and by the 1930s was contributing its welcome leaven to psychiatry, which at the time was preoccupied by the search for organic changes in the brain and nervous system, as causes of the various psychoses. It opened an entirely new field of knowledge and demonstrated that a number of functional illnesses, paralyses, compulsions, and phobias could be understood and treated. There are many interesting stories about its entrance into the universities. Its path was thorny.

In those days paretics made up 10% of mental hospital populations. They were treated with malaria and the Kettering hypertherm. Fortunately the subsequent advent of penicillin later was to remove the scourge. Several prominent analysts resurrected the theory of psychosomatic medicine and for a while it was influential. It was a perfectly good concept with a hybrid name, but its adherents claimed too much. As a result the concept then lost credit.

Meanwhile the teaching of psychiatry in the universities took on new life

and the Rockefeller Fellows in Psychiatry were working at home and abroad. In the middle thirties Manfred Sakel's insulin therapy for schizophrenia was tried, as was Meduna's metrazol convulsive treatment. In 1939 electric shock therapy was imported from Italy. Although poor and controversial, they were tools for the psychiatrist, who hitherto had lacked anything specific.

The most important of the various developments was the Rockefeller influence in the universities and the awarding of fellowships. Of that time Dr. Robert Morrison wrote in his Alan Gregg memorial lecture (1964):

> Emphasis in the teaching departments was on bringing the specialty more fully into the mainstream of medicine. Often the emphasis was on psychiatry as seen in a general hospital. The hope was twofold — on the one hand it seemed that psychiatry was bound to profit by breaking out of its far from splendid isolation in the state asylum and coming to learn some of the new techniques which had proven so effective in medicine as a whole.[5]

Conversely it was felt that psychiatry had much to do in helping to humanize the increasingly impersonal scientific practice of medicine which, excellent though it had become at prolonging life, seemed to lack interest and skill in making life tolerable for the many who sought its help.

When Dr. Gregg first came into contact with psychiatry, the field had relatively little in the way of agreed content or substance. This lack often led to feelings of inadequacy, guilt, frustration, and anxiety. The resultant emotional charge in the psychiatric atmosphere made it difficult to establish working relations with the rest of medicine and even within the field itself.[6] Thus in addition to being virtually ignored by its medical brethren, psychiatry was at sixes and sevens in its own inner workings. To run away from home was easy. The discipline was to some extent out in the cold.

This was the situation that confronted Dr. Gregg as he looked into the psychiatry practiced at the time. He saw that it was not much. With his savoir faire he said in effect to all concerned, "Look here, gentlemen, if you are not very sure of what you are trying to do, at least you can do it with good sense, good manners, good humor, and good faith." Dr. Morrison, who was Dr. Gregg's successor, said, "The effect on individuals was very great and one may guess that a good deal of the acceptance gained for psychiatry from other branches of academic medicine came from Alan Gregg's success in making psychiatry look like a good bet."

From his vantage point 30 years later Dr. Morrison asked, what are we to say about the results of this effort to put psychiatry back into the mainstream of medicine? Has psychiatry really learned from its colleagues in the basic sciences and other clinical disciplines how to do productive research? Have internists, surgeons and gynecologists learned how to recognize and deal with the psychological aspects of ordinary illness? The answers are not written clearly enough to read at a distance, he said, and I can only leave them to you who are nearer to the situation than I am.[7] The first part of this question we shall try to answer here. The second part is not quite as clear at present.

Before moving on, we must note that a revised edition of psychosomatic medicine appeared during the last few decades and is based on a much improved underpinning. It should also be noted that psychoanalysis eventually found its place in the neuroses. This left the major mental illness, the psychoses, to others. Advances in the treatment of the latter came not from America, but from the clinics in Germany, Austria, and France. Psychoanalysis, like the physical therapies, had its devotees and its vociferous antagonists.

In 1939 psychiatry was in better condition in our country, although it was still looked upon askance. A psychiatrist was appointed dean of a medical school. Then, in 1940 and 1941, we were tooling up for war. Psychiatrists had been examining draftees and the number of rejections for neuropsychiatric disorders was disturbing. Of World War II I need say little here because psychiatry for the first time played a major role in military medicine and was called upon for help as never before. Physicians expert in other fields of medicine were at a loss when faced with the large number of psychiatric casualties that were appearing. To paraphrase Churchill, it was psychiatry's finest hour. By the end of the war it had become accepted as a full-fledged sister specialty of medicine.

The real need for psychiatrists became apparent then and is apparent now because it is obvious that even those who are sympathetic and who want to understand mental illness prefer to be separated from those whose thinking and behavior are different. People become accustomed to some form of order and predictable behavior in daily life, and the mentally ill are often unpredictable. Despite the fact, therefore, that mental illness is ubiquitous, plays no favorites, and spares no age group, creed or culture, the victims are at a disadvantage in the very milieu in which, because of illness, they become dependent. Psychologically the world regards them as stepchildren of life. Perhaps this is the factor that has accounted for their sad lot down through the ages. This very fact indicates the need for physicians who understand them and are comfortable in caring for them; it alone justifies psychiatry. A number of anti-psychiatry groups now purport to see no need for the specialty and denigrate it at every opportunity.

Unfortunately, although psychiatry came into full flower during the war, it became a victim of its own success. It became an important part of medical practice. Its activities attracted many other disciplines to it, and while basking in its own glory it tried to undertake too much. The public, and some psychiatrists who should have known better, overvalued its possibilities. The result was inevitable. Having moved beyond its sphere of competence, it lost face. It was compelled to start all over again to rebuild confidence with the public and with medical confreres.

In the late 1940s and 1950s psychiatry functioned in private practice, in hospitals, and in clinics large and small. Two of the former residents of Pennsylvania Hospital helped to form a psychiatric section in the nation's largest and most famous clinic and had an excellent opportunity to collaborate with some world-famous physicians and surgeons in what is called today Consultative Liaison Psychiatry.

The 1950s were important to us for a special reason: new and powerful drugs appeared. Chlorpromazine, the first of them, had been tried successfully in France. I shall consider the drugs at greater length a little later in this discussion.

The 1960s were disastrous not only for psychiatry but also for educational and other institutions. Medical students and even residents became victims of the youthful unrest and rebellion which swept the country. In one first-class psychiatric program in the West, residents refused to study the psychodynamics of the neuroses, calling it the mental masturbation of uncaring in a time of trouble. They were interested in eliminating poverty, prejudice, racism, and other evils. This indeed is a blessed wish, but medical students and physicians are totally unprepared even to begin to know how to go about it. Some community clinics were later manned by the new breed. Forgetting their purpose, they became sociologic enterprises and in the process they vitiated the purpose for which they had been established. In the late sixties a radical group lost sight of its reasons for existence. It announced the intention to break up the specialty which, it alleged, gives support and provides enhancement for the "U. S. ruling class," its imperialist system, and the racist institutions which uphold it.

It is important to mention in this context the report of The Joint Commission on Mental Illness and Health and President Kennedy's Mental Health Message to Congress in 1962 and 1963. A number of us were members of the Commission and of the one which set up the up the Community Mental Health Centers. It was hoped that these clinics might serve blue-collar workers and keep them from having to go to state hospitals, but some centers were quickly deflected from that purpose.

The question of community mental health is of great importance especially since the state hospitals are being phased out. Unfortunately, many state hospital patients were turned out precipitously and, although directed to community centers, ended up in the streets again as they had 150 years earlier. They went from back wards to back alleys, but that too is a story we should return to later.

Before we consider the psychiatry of the nineteen seventies, let us glance at the condition of general medicine, for the advent of the new psychoactive drugs was to produce widespread change. In reference to the new drugs, medicine was entitled to ask us, what is the expertise of the psychiatrists? *What can they do that others cannot do and what if anything can they do better?*

There is no doubt that the psychiatrist's training fits him to treat, better than other physicians, seriously disturbed and depressed patients and patients with psychosomatic disorders, to practice liaison psychiatry, to prescribe psychopharmacologic drugs and to use other psychosomatic therapies. He can also aid in the diagnosis of physical disorders which have emotional concomitants. It might be wise, therefore, for psychiatry to change direction still further as it moves closer to medicine and to eschew large segments of its former interest in problems that can be handled by psychologists, social

workers, counselors, and others who tend to problems of everyday living — "the worried well." But let us take a careful look at the basic medicine toward which psychiatry is moving, for part of any profession's self-maintenance lies in its public image, and the American public at present is of two minds in regard to its doctors. In general the family's personal physician is held in high regard. Many are held in affection, and, in general, the profession of medicine ranks highest in public admiration. Yet doctors as a group have slipped several notches in public regard and are now roundly castigated by labor and by political orators — often unfairly — for defects in the expensive system of health care over which physicians have little control. But then people in general are quizzical about us for several reasons.

Jacques Barzun writes that the professions of law and medicine are under siege. "The doctors formerly worshipped as omniscient good samaritans," he said, "are now seen as profiteers, of doubtful competence." He admits that "part of this animus comes from the general unrest and impatience with authority in the Western world coupled with the belief that anything long established is probably corrupt."[8]

What people hear and read and perhaps what they have experienced causes them to be unhappy about the medical profession on a number of counts. The image of the devoted family doctor of old is replaced in many minds by particularly efficient and capable young professionals, much better equipped scientifically than all of their predecessors, but often in a hurry and sometimes brusque as well as affluent. These characteristics are seen as inappropriate in a profession which holds itself to be interested in humanitarian goals.

Along with the criticisms we might note another factor which is operative in the nation at large and which also affects medicine. We seem to have lost our heroes, in part because of scandal in high places, but also because of the general debunking spirit that is manifest in this rationalistic age. Unfortunately this spirit is accompanied by a pervading cynicism abroad and a false egalitarianism that seems comfortable only when everyone is believed to be reduced to a single standard of mediocrity. "Any reference to quality", Barbara Tuchman wrote, "is instantly castigated as elitism which seems to inspire in users of the word, the sentiment of Jacobins denouncing 'Aristos' to the guillotine."[9]

This uneasy state of medicine's relations with the public is worrisome. The bad state of the economy does not help. Obviously the unrest cannot be attributed to scientific inadequacies of medicine. Physicians now can do more for patients than ever before. People do not sue doctors because of their lack of scientific acumen; rather they become angry and sometimes litigious because of real or fancied slights, rejection, or lack of consideration. With all of their knowledge and skill some doctors cannot make patients understand that they are interested in them and that they care about them.

A common criticism is that the doctor does not listen to their complaints; when translated, this means that doctors do not spend time with patients or show sympathetic interest in them as persons. Physicians, secure in their scientific knowledge, do not seem to recognize that patients need more than

the application of technical expertise. True, there are patients who, if permitted to talk freely, would use up all of the doctor's time; but most individuals are satisfied with good manners, some time, respect, understanding, and some show of empathy. One can educate students and physicians even until old age, but unless they can display warmth and interest in the patient as well as in the disease, they will be found deficient.

Accounts of medical happenings in the press regularly stress the sensational. Also the unfortunate activities of a deviant doctor are expanded out of all proportion and lead to erroneous generalizations. Dramatic medical breakthroughs are front-page news. In the face of these factors, sufferers from chronic disease come to distrust the doctors. Why, they ask, with these miracles on hand can they not be cured of their cancer or diabetes? Politicians, of course, have a right to examine the huge sums that the government spends for health projects, but they are prone to dwell more on what is wrong than on what is right. Strangely, many of the charges made by reporters and in Congress are based on self-criticism by members of the medical profession itself.

Barzun[10] notes the importance of any encounter between human beings. "Nobody ever sues a vending machine that doesn't work," he says, "no blame is attached. But as soon as a person serves another, ethical issues spring to life and get settled well or badly."

Now let us return to further consideration of modern psychiatry, which has not escaped criticism. At present we are criticized roundly for following what is and always has been the "medical model." Some critics now say that mental and emotional problems are not diseases, but it is our function to treat diseases only, and these imply some form of organic change. This assertion is palpably untrue on the face of it, for medicine and medical practice need not be so limited to scientific principles and known facts. What distinguishes medicine is a philosophic orientation toward dealing with symptoms and signs that represent disease and illness and the belief that the elimination of underlying causes will result in cure or improvement.

Man is a social animal whose progress and frustration arise in relation to others and whose daily life is influenced by numerous intrinsic and extrinsic factors. If we are to treat man's ills, we must be aware of all of the factors that influence him — biologic, cultural, and social — and we must understand the part they play in his presenting symptoms. A comprehensive approach will be the natural evolution of medical practice. Attention to the over-all influences which color these ills can in no way imply neglect of the great scientific progress that medicine and psychiatry have made and will continue to make, no matter how the economic climate changes. We dare not forget our ideals as physicians.

Criticism of the medical model strikes directly at psychiatric diagnosis. The problem is not alleviated by those colleagues who would tie psychiatric diagnosis more closely to the sociologic aspects of the patient's illness. Every doctor worthy of the name knows that he must take into consideration the social and environmental conditions under which the patient became ill. We do not limit ourselves simplistically to a medical model. We need

what George Engel calls the sociopsychophysiological model in order to understand thoroughly the conditions presented to us. This is a new and long term for what we should be doing. The concept is, Engel[11] states, an extension of the framework of the biomedical model into areas heretofore neglected.

Unfortunately, for several years we psychiatrists have been listening to various pied pipers who write about "Myths of Mental Illness," "The Madness Establishment," "Prisoners of Psychiatry," etc., to the point that we have had to interrogate ourselves severely, for we are being described as jailers. Antipsychiatric circles ask, "What is psychiatry, and should it continue to exist?" Some psychiatrists hold that most of the abuse to which we are subjected arises from the reluctance of many colleagues to restrict their activities to the fields in which they are qualified to operate. A psychiatrist is one who treats mental and emotional disorders, not as one English physician observed, one who prevents wars, cures anti-semitism or racism, and offers to transform the normal abrasive relations between men into a tedium of stultifying harmony, or misuses his jargon to confuse any and every topical question in incessant series of television appearances.

Psychiatry has two givens. The first is that there are millions of people who suffer from the annoyances and torments of emotional and mental disorders, many of which have physical accompaniments and some of which are even the result of somatic disorders. The second given is that psychiatrists are physicians trained to detect and treat illnesses of the whole individual — psyche and soma.

In the minds of many individuals, even of professionals, the two terms disease and illness are regarded as synonymous. This identification is not correct. Barondess[12] calls attention to the difference. A *disease* is a biologic event of a pathologic sort. It is something that happens to a cell or to a molecule or to an organ, an organ system, or even to an entire organism. Ultimately, it is a biologic process and is to be understood in scientific (that is to say objective, quantitative, reproducible) terms.

An *illness*, on the other hand, is a human event. It is a grouping of discomforts, disfunctions and resultant personal and social dislocations occurring in a person and reflecting the interaction of that person with a disease. It is to be understood not in scientific but in human terms. The prime consideration is that in our scientific advance we must guard against dehumanization in our management of illness. We must recognize that there are two sets of important needs to be met: that empathy is more than courtesy at the bedside, and that we have to understand and feel the patient's experience.

Let us now look at what we might do to get out of our quandary. René Dubos[13] has called our attention again to the fact that physicians have always depended not only on their scientific knowledge for therapeutic success, but also on their ability to instill into patients an attitude of confidence and peace of mind to go along with the medication. We seem to have forgotten this vital fact. "Medicine," he says, "had very little to offer by way of effective therapy until a few decades ago and the cures of organic disease that ancient physicians brought about were due less to the method of treatment they used than to the

patient's faith in their effectiveness." This fact was recognized by most doctors but most emphatically by Sir William Osler.

Unfortunately in our efforts to keep up with the times, we are sometimes tempted to neglect those phases of medical care which of old have proven their worth. Dr. Thomas Durant recalls the Apostle Paul's letter to the Church at Thessalonica in which he admonishes his readers to "hold fast that which is good." Paul's "counsel is particularly applicable to those who tend to worship the present and to scorn the past. The present may indeed represent the high immediate mountain view of medicine, but for all that the valleys of the past and the small mountain ranges that confine them are willy-nilly part of the present."[14] This is not to descry the importance of learning new developments that are proven or to analyze critically those that seem good but have not yet stood the test of time. Chief among the older techniques which I should like to recall to you is that humanistic personal approach to patients, for presently it is being rediscovered by scientists and medical students alike.

The importance of the advisory "Hold fast that which is good" is of the greatest importance today in psychiatry, for now we have a greater understanding of the illnesses we treat and for the past two decades we have had drugs which are potent in their treatment. Further, we have a much better understanding of psychopharmacology, psychophysiology, and psychoendocrinology. In other words, we know how our drugs work but must remember that *we are the means by which these drugs are transmitted to our patients* and it would be a loss and a shame if in our methods of administering them we were to forget to instill confidence in the patients whom we treat.

No longer do we as physicians use the attire or the air of wisdom which were the marks of the old family doctor. We have instead medicaments that work. Dubos writes of the illustrious William Henry Welch (1850-1934), the main architect of scientific medicine in this country, that he recognized the importance of the psychological aspects of healing. He had seen them operative in the medical practice of his father in the 1870s and later. It was said that the moment that William Wickham Welch entered a sick room, the patient felt better. The aura of healing seemed to surround his physical body; often it was not his treatment but his presence that cured. Many physicians would like to divest themselves of the aura attributed to them, but patients would be foolish to let them do so, for it is in this presence and this belief that a large part of healing takes place. It seems to be a universal therapy, often successful. I saw it as a boy in our own family doctor.

It is especially important to keep this phenomenon in mind today in general medicine, when so many machines and paramedical persons intervene between the doctor and his patient. Of course, many diseases are not cured quickly by any form of psychotherapy, but it is still true that a large number of physical and mental ills that lead people to seek help can be corrected by ways of healing that do not depend heavily on scientific medicine. It is now believed that some ways of healing depend on self-healing. However we cannot go back again to the horse-and-buggy days when art alone loomed so large. But science and art

are not incompatible; the best physicians use both. It would be quackery to practice medicine today without technical skill.

Dr. Robert H. Moser sums it all up very well in an article entitled, "Knowledge Is Not Enough."[15] "But if you want cooperation" he writes, "the patient must understand the nature of the problem, how you are going to approach it, and why you need his help. This brief period of person to person communication is a golden moment — re-enacted every day, every hour, in offices and hospitals across the country — the chance to provide the patient who is clinging to every word, a flash of insight into the realities of medicine. How often do physicians seize the opportunity? Well as we all know, rarely."

Recent events in medicine give psychiatrists a great opportunity to be of help as patients express dissatisfaction with current patterns of care, probably in large part because of the psychological dysfunction that accompanies their physical illness. As a result psychiatrists are now welcomed in departments where they were unable to work before, such as dialysis units and cardiac and continuous care units, where they can be of great assistance to the physicians in the management of patients. This trend shows signs of growing. In this relationship the psychiatrist aids in treating the whole patient and brings to the physician more knowledge of the emotional aspects of illness.

During the last few decades psychopharmacology has burgeoned. "Numerous new drugs have been introduced to clinical practice. Although introduced mainly for the treatment of psychiatric disorders they have also found place in the treatment of a variety of medical and surgical illness."[16] Chlorpromazine, used widely in the treatment of schizophrenia and a wide variety of psychiatric disorders, is also useful in the management of metastatic carcinoma to relieve distress, promote calmness, diminish pain, and control vomiting. The benzodiazapines have virtually superceded all other drugs for the treatment of anxiety and tension in gastrointestinal, cardiorespiratory, gynecologic, and neurologic syndromes. Lithium in experienced hands is a godsend when used in bipolar manic depressive disease. It is instrumental in preventing relapse. Something like it had been sought for several generations.

Seymour Kety, an excellent investigator, writes, "Today the accumulation of new biological knowledge and powerful techniques is waiting to be applied to the problem... There are procedures employing radioactive tracers that permit one to map the circuits of the brain — there are sophisticated genetic studies that permit a localization of these defects to particular chromosomes." He observes that "a new generation of neuroscientists has been trained and skilled in fundamental research and some in psychiatry." "The time has never been more propitious for progress toward an understanding of the human mind."[17]

I have not mentioned the welcome and valuable contributions of behavioral medicine, biofeedback, and some of the other therapeutic possibilities, for lack of space. They too make the situation bright for the future of the discipline. Behavioral medicine has greatly enriched the psychosomatic field and deserves a chapter of its own.

Perhaps Leon Eisenberg best summarizes what I have been saying here:

> Psychiatry at its best is a paradigm for the general medical practice for the future. This may seem an outlandish claim for a field which boasts so few spectacular advances. Yet I believe it to be true because psychiatric practice deals with human distress in a context that must include the psychosocial as well as the biological. There are no imperialistic aims behind the claim. Quite the contrary, in so far as psychiatry is successful in clarifying the psychobiological bases of health and illness, that knowledge will pass into the domain of the generalist and the psychiatrist will join other specialists in the secondary and tertiary cadres of the health system.[18]

It does appear that psychiatry has fulfilled many of the hopes that Dr. Gregg expressed for it. It has emerged from the isolated hospitals, it has assembled first-class researchers, and it has a workable and essential philosophy to take back to medicine. I still must look elsewhere, however, for an answer to the question whether medicine has filled its part of the hopes of Dr. Gregg. I think that physicians are beginning to examine what psychiatry might have to offer. Some clinicians have commented upon the patients they see who have emotional problems underlying their physical complaints. So many of these excellent physicians are comfortable in their scientific knowledge; yet they are now realizing that patients need more than that. We need to ask, for example, why families of patients who are terminally ill desert the attending physician, seek out quacks and television shows or depart in busloads to another country. These patients and their families have strong need of support. Sometimes they feel abandoned by their doctors. A multimillion dollar industry of nonmedical healing is patronized largely by patients who seek sympathy and attention which they feel they did not receive elsewhere. Expert sensitive physicians can deliver both excellent medical care and the support that is needed.

Should you think these observations simplistic, please understand that it has taken us fifty years to reach our present conclusions. Should you think it all old discussion and much ado about nothing, note that the *Lancet* of August 2, 1980 (p. 271) reports the work of a study by the Nuffield Group, which comes to about the same conclusion as I have outlined here. It was published in an editorial entitled, "How Not to Talk to Patients."

I hope my point has been made: the psychiatrist must retain his identity as a physician. In addition to expert knowledge of psychotropic drugs he should retain sufficient biologic knowledge of physical illness to recognize the protean psychiatric manifestations of such maladies as brain tumor, thyrotoxicosis poisoning, and so on. We would not be expected to make complicated medical or surgical diagnoses, but we should know where and when to refer the patient.

I said earlier that our sick patients are on the street again. You will see them in the center cities, in railroad stations, or in any place that is warm. You will not see where they are living, for many of them live in fleabag hotels, where they are robbed and their social security checks are taken. Some of them were

dislodged from state hospitals before they were ready and were referred to community clinics, many of which were not ready either. Presently they are being discharged after a limited time in order to protect their civil liberties. Civil liberties are precious and they must be protected — this is the price of freedom — but I agree heartily with Dr. Roger Peele of Washington, who has had extensive experience with the problem. He writes, "It is a perversion and a travesty to deprive these people of treatment to preserve a liberty which is actually so destructive as to constitute another form of imprisonment."[19] Many of these patients really require special housing and special care, for they are too ill to live in an open setting or to take medication on their own. Some of these patients are being robbed and murdered, but their civil rights are still intact.

We are now constricted by law in regard to the length of time that patients can stay even in private psychiatric hospitals, no matter how sick they are. The courts, lawyers and civil rights agents tell us whom we may commit and how we may and may not treat them. Third-party payers tell us what they will and what they will not pay for, regardless of circumstances. Furthermore, you will now treat hospital patients the way the inspection teams advise to do or you will not be approved. If you are not approved, your patients will not qualify for Medicare or Medicaid.

We have traced psychiatry as it left home in its troubled adolescence and, like the prototype adolescent, tried on several faces to find one which was satisfactory. We saw it gain stature, lose it, and gain it again at an even higher level. While it has been away its family, general medicine, has had some of its own trials, and now as the erring sibling returns home it is able to bring with it some valuable and helpful knowledge that medicine once knew and has forgotten. One can prophesy a pleasant and licit symbiosis of psychiatry and medicine in the future.

As does psychiatry in general, I too, have a deep debt to Philadelphia — La Salle College, where they tried to instill into me the satisfaction of a classical education, Jefferson Medical College where for nearly seven years I had learned clinical medicine at the hands of Thomas McCrae and those of similar competence and then to 44th and 49th Street, segments of the Pennsylvania Hospital where I encountered Drs. Bond, Strecker and Appel, each of whom influenced me greatly. Dr. Strecker attracted me to psychiatry; Dr. Appel saw the possibilities of a future for me and arranged it as best he could. Not only am I grateful for these steps in my career, but I hold those active in its formation in real affection.

I close expressing my appreciation for the honor of opening this lecture series memorializing a beloved colleague and friend, and my thanks to you for your courtesy.

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Pediatric Surgery: The Newest Speciality for the Youngest Patient*

C. EVERETT KOOP

THE concept of the separation of pediatric surgery from its adult counterpart is not recent, but there is no doubt that the United States lagged behind European countries. The Swiss surgeon Felix Würtz (1518-1575) is credited with the first treatise on pediatric surgery, which appeared in English translation as *The Children's Book* in 1656.[1] *A Practical Treatise on the Diseases of Children* issued by J. M. Coley of London in 1846 contains a special section on surgical diseases. For the period from 1856 to 1877 there were approximately fifteen articles and books on surgical conditions of children by English, French, and Italian authors, one a compilation of twelve Lettsomian lectures by Dr. Thomas Bryan of London in 1863.[2]

Books on pediatric surgery have been appearing in many languages during the past seventy years, clearly indicating a demand for improvement in the surgical care of children. The first special book on pediatric surgery in this country was one by DeForest Willard in 1910.[3] The first modern book, based largely on their personal experiences at Boston Children's Hospital, was that by Ladd and Gross in 1941.[4]

The first children's hospital in the English-speaking world was that which we know today as the Hospital for Sick Children, Great Ormond Street, London. In the initial subscription for the building Charles Dickens played a prominent role in persuading his fellow countrymen that the needs of children required special attention. Just a few years later, in 1855, the second children's hospital in the English-speaking world and the first in this hemisphere was established, namely, the Children's Hospital of Philadelphia. It has changed its location three times, most recently in 1974.

* A lecture delivered at the College of Physicians of Philadelphia, November 5, 1980, in conjunction with the 125th anniversary of the Children's Hospital of Philadelphia.

1. See Fielding H. Garrison, "History of Pediatrics," in *Abt-Garrison History of Pediatrics*, ed. Isaac A. Abt (Phila.: W.B. Saunders Company, 1965), p. 65. Würtz' treatise on infantile surgery was added to the 1612 edition of his *Practica der Wundartzney* (orig. pub. 1598).

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In North America at the turn of the century there were few children's hospitals but they were being recognized as centers of progress and information as well as centers for training in pediatrics. Although the development of pediatrics was rapid, pediatric surgery undoubtedly did not keep pace with it. Pediatric surgery in those days if called mediocre was being described in most charitable terms. Children died because of incorrect clinical diagnoses, traumatic techniques, failure to recognize pathological conditions found at operation, and abysmal postoperative care.

The persistence of mediocrity continued because surgeons discussed only adult conditions at their meetings. They did not attend pediatric meetings, read pediatric literature, or study pediatric physiology, hence they were not even aware of their deficiencies. Surgical residents in training obtained little experience with lesions found in children. Except for hernias and the occasional pyloric stenosis or perhaps an intussusception, surgical training even in my day was almost devoid of pediatric experience.

Let me tell you about the care of a hernia in children when I was a resident at the Hospital of the University of Pennsylvania in the years 1942 through 1946. In children less than three years of age we never operated unless the intestine was incarcerated and irreducible. Child patients wore first yarn trusses, always impregnated with urine and feces, and later leather trusses, impregnated similarly. Operation was undertaken as though they were fifty-five years old and as if a recurrence was to be expected. The patient was laced up like a 59-cent football under an incision that went from the pubic tubercle to the anterior iliac spine; the skin was closed with interrupted sutures or Michel clips. After operation the patient was elevated on a little metal saddle and then was wrapped tightly with a muslin bandage, which had no give to it whatsoever; soon after application it was as loose as a blouse. The purpose of this binder was to prevent recurrence caused by coughing or straining at stool.

We managed respiratory infection prophylactically. Camphorated oil was applied to the chest of each patient three times a day. The Hospital of the University of Pennsylvania was the only hospital I knew that smelled of moth balls instead of antiseptic. I finally convinced Dr. Jonathan Rhoads that we could stop the camphorated oil, which could have done no good and which took countless nursing hours for application. I added that in all likelihood Dr. I. S. Ravdin would not even notice the change in procedure when he came back from Burma at the close of World War II. If he did we could always go back to camphorated oil. Whether he noticed the change or not upon his return, he never mentioned it.

Hospitalization took fourteen days. For six weeks thereafter the child was warned not to sneeze, laugh, cough, strain, or lift. If that technique of management had been continued after I went to the Children's Hospital, three complete wards could have been filled constantly with nothing but hernia cases. Today our internal Professional Standards Review Organization (PSRO) will not certify an overnight stay for a hernia patient over three months of age.

Pediatric surgery can be defined as the application of sound surgical

principles in the treatment of a developing organism which is in the period of most rapid change in its entire life span. Although the principles remain constant, the application requires constant adjustment. If surgery in adults is the surgery of involution, surgery in children is the surgery of evolution. In a sense it is physiological surgery as contrasted with excisional surgery. In the newborn it is the surgery of the transition between the protected intra-uterine existence and a world of relatively harsh external stimuli. This is a period of adjustment of heat regulation, of fluid and electrolyte balance, of nutrition, and of neuromuscular mechanisms. It is the time when arithmetical computation of requirements based upon those of a 70 kg. adult proves inadequate. The pediatric surgical patient often does not understand our language, cannot or will not cooperate, has emotional and mental reactions that are frequently unpredictable, and always has distraught parents who believe that they are facing a crisis even in a routine situation.

My experience in pediatric surgery has led me to see it in two contexts. First, the infant has remarkable elasticity if you remember his limited reserve. Second, if postoperative care in an adult is like driving down a three-lane highway, postoperative care in an infant is like walking a tightrope.

Pediatric surgery in North America really began with William E. Ladd. In 1908 he was appointed to the visiting staff of the Boston Children's Hospital, where he served for twenty years doing occasional procedures under chiefs of surgery who were general surgeons. As early as 1914 he became deeply interested in the surgical problems of children and convinced that most general surgeons were not qualified to treat the surgical problems of childhood, especially those of infancy. Because of his ideals, his keen analytical insight, and his technical excellence, he was certainly the initiating factor in the improvement of surgical care of children on the North American continent.

When I went to Boston in April of 1946, Dr. Ladd, recently retired, would take lunch at the Harvard Club on weekdays and would then drop in at the Children's Hospital, where surgical residents were always glad to see him. I think he missed his former contact with children. He would sit on a bed with his long legs dangling over the edge and recount interesting anecdotes about his years at Boston Children's. The teaching I received through these anecdotes was the best part of the seven months that I spent at the Boston Children's Hospital in that year.

One of the residents who had been there while Ladd was active commented on his prowess at working in the neck with apparently complete understanding of its anatomy. Dr. Ladd said something like this: "Boy, do you know when you come in late at night in your own home and you don't want to wake anybody up, how you walk across the living room into the kitchen and you don't hit any furniture? That's because you know where everything is. That's how I feel when I am in the neck."

Two other general surgeons in the United States were also dissatisfied with the surgical care of children. At about the same time or just a little earlier Dr. Oswald S. Wyatt, after being graduated from the University of Minnesota,

began the practice of general surgery. During the first nine years he became thoroughly dissatisfied with the quality of surgical care given to infants and children by general surgeons. He decided to devote all his time to the improvement of their care.

And so, it happened that independently, but impelled by observations and ideals similar to those that had already attracted William E. Ladd, Herbert Coe in 1919 and Oswald Wyatt in 1928 began the specialized practice of pediatric surgery in Seattle and Minneapolis, respectively.

In those days even friendly surgeons wanted to know what pediatric surgery was — "tonsillectomies and circumcisions?" Even twenty years later, how often many of us heard the comment, "Any surgeon can take care of a hernia or an appendectomy in a child."

In 1941 the establishment of the Ladd Professorship of Child Surgery at the Harvard Medical School gave stature to this speciality, although Dr. Ladd had already been assistant professor and clinical professor of child surgery for eleven years. In the same year Dr. Ladd gave an address to the Boston Surgical Society entitled, "Children's Surgery and Its Relation to the Specialities."[5]

There were people who criticized Dr. Ladd after that address, including Dr. Churchill of the Massachusetts General Hospital, who said that his residents knew very well how to operate on bunny rabbits and if they could do that they could certainly take care of infants. Coincidentally the pathologist at Massachusetts General Hospital invited Dr. Ladd to the morgue to see some specimens and help explain them. What Dr. Ladd found were three cases of volvulus of the midgut caused by malrotation of the colon in three children now obviously dead. In two the abdomen had been closed because the lesion was not understood, while one had been operated on incorrectly — all by the residents who well understood the surgery of bunny rabbits.

In those days pediatric surgeons undoubtedly felt more at home in the presence of pediatricians who really appreciated what they were doing than they did in the presence of surgeons who resented the fragmentation of surgery. Therefore, it was appropriate in 1946 that the executive board of the American Academy of Pediatrics appointed a committee to gather information on improved surgical care for children. After a two-year study the committee recommended the formation of a section on surgery, membership in the section to be restricted to those surgeons, not less than 90% of whose practice was in the general surgery of infancy and childhood. In the United States, Canada, and Mexico twenty surgeons had been found who met this requirement and who agreed to accept charter membership. An initial meeting was held in Atlantic City in 1948. I am proud to have been a member of the organizing committee.

5. Personal communication, William Edwards Ladd; see also his "Children's Surgery and Its Relation to the Specialities," 13th Annual Arthur Dean Bevan Lecture (Chicago: Chicago Surgical Society, 1941).

By its action the Academy of Pediatrics rendered pediatric surgery a conspicuous service. It provided an excellent meeting place for sessions and exhibits before a large body of interested persons and a forum for discussion of subjects of common interest.

Shortly afterward the Surgical Section established the William E. Ladd Medal, to be awarded by the Academy for major contributions to pediatric surgery. Recipients of the medal are granted an hour to address the entire Section or the Academy, as seems appropriate.

The international group which provided an important springboard for pediatric surgery was the British Association of Pediatric Surgeons, in its early years a very small group of British and continental Europeans who met to discuss broad subjects in this speciality. My first encounter with the BAPS, as it is affectionately called, was in 1956; two years later I was elected to its council, a position I held for twelve years. This was for me an extraordinary opportunity to work hand-in-glove with the British and European surgeons, and it made possible the transatlantic exchange of information on many occasions. As an American I was able to meet with the presidents of the several royal colleges and to influence their acceptance of pediatric surgery as a speciality in Great Britain, but I was not able to accomplish the same thing in my own country.

The BAPS established the Denis Browne Medal; this often repeated comment appropriately appears on the medal: "The aim of pediatric surgery is to set a standard, not to seek a monopoly." Through my urging, when Dr. I. S. Ravdin presided over the Board of Regents of the American College of Surgeons, that organization established an advisory committee for pediatric surgery, analogous to its committees on other surgical specialities.

One man, Dr. Robert E. Gross, probably contributed more than anyone else to the growth of pediatric surgery.

In 1960, while I was in Japan, the Japanese Pediatric Surgical Society was formed. During this visit I delivered thirty-three addresses — some of them brief — in thirteen days. I returned for the fifth anniversary in 1965 and on that occasion was surprised to be introduced as the father of pediatric anesthesia in Japan. This I presume stems from the fact that after I saw the beginnings of pediatric surgery in Japan and the abysmal state of pediatric anesthesia, I suggested that attention be given to anesthesia before the speciality of pediatric surgery was isolated. There was no trouble in putting a child to sleep; the difficulty was in waking him up!

We finally came of age in the United States with the establishment of the *Journal of Pediatric Surgery*, the formation of the American Pediatric Surgical Association, and the accreditation mechanism provided by the American Board of Surgery, which grants certificates of special competence in pediatric surgery.

The *Journal of Pediatric Surgery* was long overdue. Pediatric surgeons had had to compete with all other surgical specialists for space in surgical journals and with pediatricians for space in pediatric journals. There was no pediatric surgical journal in English, but journals existed in Germany, France, Portugal,

Finland, and Japan. I served as editor-in-chief of the *Journal of Pediatric Surgery (JPS)* for its first eleven years, and saw its gratifying growth as the number of pediatric surgeons in the United States and Canada increased eightfold. *JPS* is the official journal of the American Pediatric Surgical Association, the Surgical Section of the American Academy of Pediatrics, the British Association of Paediatric Surgeons, and the Canadian Association of Pediatric Surgeons.

The American Pediatric Surgical Association (APSA) was also long overdue. Although in the early days pediatric surgeons were glad to function under the aegis of the American Academy of Pediatrics, we *are* surgeons and we needed a surgical society if we were to have recognition among surgeons. APSA was formed in 1970.

In all likelihood a certificate of special competence in pediatric surgery awarded by the American Board of Surgery would not have come about without the development of the *Journal of Pediatric Surgery* and the formation of the American Pediatric Surgical Association.

If we had made these efforts thirty years earlier, they would have been far easier to achieve. Conversely, if plastic surgeons, for example, had tried for speciality recognition at the same time that we did, they too would have had difficulty. The reason, of course, was that general surgeons were becoming highly sensitized to additional splinters being taken from their log.

A history of the frustrations and disappointments that we encountered in achieving our organizational goals would include the names of all the stalwarts of pediatric surgery in America, as well as the names of many leaders in general surgery who came to our assistance.

The obstetrician in the birth of this project was Harvey Beardmore of Montreal. Beardmore was at a meeting in Tokyo when he received the following telegram from Keith Reemtsma, a former student of mine who, I was certain, was heading for pediatric surgery but is currently the chairman of the department of surgery at the College of Physicians and Surgeons at Columbia University: "Good news, American Board of Surgery approved unanimously certification in pediatric surgery. Have sake and pinch a geisha for me." There were still some ups and downs before the first examinations were given in April 1975.

During the more than twenty years of my struggle for this kind of certification, I was confident that I would be classed as a "grandfather" and never be required to take the examination. To my dismay the American Board of Surgery refused to permit a "grandfather clause." Doctors Judson Randolph, Marc Rowe, and Harvey Beardmore wrote an examination presumably taken from previous pediatric surgical questions given in Board examinations in general surgery during the preceding decade. Presumably these three gentlemen passed the examination because they wrote the questions for the examination that I had to take. Although I passed that examination, I am pleased to report that by the time the day for my recertification arrives, I shall be too far beyond the age of sixty-five to consider it seriously. About 300 surgeons in the United States and Canada now hold the certificate of

competence in pediatric surgery; an additional 200 members of the Surgical Section of the Academy of Pediatrics practice pediatric surgery in North America.

How did pediatric surgery come to the Children's Hospital of Philadelphia, or indeed to all the land from Boston to Chicago to Florida?

At the old Children's Hospital in the 1930s and 1940s several general surgeons took turns operating on ward patients; three of them went to war in 1941. The one who remained behind was overworked, unquestionably, but on one occasion he was called to see a patient who was thought to have intussusception. When he did not come in four hours, he was called again, and when he did not come in eight hours, the call was repeated. When he finally appeared, the patient had just died. The director of nurses in the Children's Hospital of Philadelphia had previously been an operating room scrub-nurse under William E. Ladd. She went to Joseph Stokes, Professor of Pediatrics and Physician-in-Chief of the Children's Hospital and said, "I will give you one year to find a child surgeon to establish in this hospital the same kind of service that they have in Boston at the Children's Hospital. If you do not, I and my staff will leave. And when I say that I mean *all* of my staff."

Dr. Stokes went to A. N. Richards, Vice President in charge of medical affairs at the University of Pennsylvania, who went in turn to I. S. Ravdin, just named John Rhea Barton Professor of Surgery at the University. Dr. Ravdin went to three of the four general surgeons on the staff of the Children's Hospital and asked each one if he would be willing to give up his adult practice, go to Boston for training, and confine his practice thereafter to the surgery of childhood. All refused.

One day, a few hours after I had been admitted as a patient suffering from a streptococcus infection of the throat and a high fever in the Hospital of the University of Pennsylvania, Dr. Ravdin came to visit me. He asked what I planned to do with my life when I finished my residency. I told him that I had come to Philadelphia to get my training and had planned to return to New York, but I had become enamored not only of Philadelphia but also of the University of Pennsylvania, and that the weakest part of his program, in my estimation, was his tumor clinic. If he would give me the opportunity to take that over, I said, I would make it sing for him. He said, "How would you like to be surgeon-in-chief of the Children's Hospital instead?" I replied, "It is my second choice."

He told me then that I was to discuss the matter with no one but I was to let him know my decision within a week. I was to go to the Children's Hospital of Philadelphia in January of 1946. I was then to go to Boston for a year beginning in April, provided that I liked the Children's Hospital and that the people there liked me.

My first day at the Children's Hospital, January 4, 1946, was not auspicious. The first person I met said, "Why don't you go back where you came from? We don't need you, we don't want you, and you put three good men out of a job." All these statements subsequently proved to be false.

No arrangements had been made for my welcome at the Children's Hospital — if indeed one could call it that — and I thought it proper to seek out Dr. Joseph Stokes, Jr., Physician-in-Chief of the Children's Hospital and Bennett Professor of Pediatrics at the University of Pennsylvania. Dr. Stokes held me at arm's length as he took me through the building from garret to cellar and then took me to his office where he said, "You know, Dr. Koop, that all surgical patients are admitted on my service. When they are ready for operation, we will call you and then we will take care of them after their surgery until discharge." I replied, "That *was* the way it was up until today, Dr. Stokes. From here on, patients will be admitted to the Surgical Service, we will make their diagnosis, perform their surgery, conduct their postoperative care and discharge them and be responsible for their follow-up."

Dr. Stokes immediately telephoned Dr. Ravdin. Although I could not hear the other side of the conversation and Dr. Stokes said very little after his opening statement, his chagrin made it clear that I had won my first battle.

There was no office for me at the Children's Hospital nor was one planned. As I sat in the library that afternoon wondering how I could survive in that hostile environment, I realized that my pulse was totally irregular. At the end of the day I went out to the University Hospital and reported to Dr. Ravdin, to whom I said, "I am fibrillating." Dr. Ravdin was very annoyed and said, "You're not fibrillating! Let me feel your pulse." After which he said, "You're fibrillating."

An agreement on pediatrics had existed between the University of Pennsylvania and the Children's Hospital of Philadelphia. All the arrangements were indicated by title only. The two institutions signed a second agreement on pediatric surgery. In this I was mentioned by name. It was stipulated that I would go to Boston after three months at the Children's Hospital, provided that the people at the latter institution liked me and I liked them. It is fair to say that at this stage they did not like me and I did not like them. Nevertheless I went to Boston, where I spent seven months, followed by a month at the Sick Children's Hospital in Toronto, where I looked over surgical shoulders before returning to Philadelphia. There I took over the responsibilities of surgeon-in-chief although I did not receive the title until 1948.

Those were very difficult days. The Children's Hospital had one operating room, built after the manner of the Allgemeine Krankenhaus in Vienna. It had 125 seats in an amphitheater, the operating room itself being in a tiled pit. Adjacent was a room which I began to use as an operating room. There was only one nurse anesthetist. She would leave the patient I was operating upon, induce anesthesia in the next patient in the adjacent room, and then run back to drop a little ether on the mask periodically. If pediatric surgery was to prosper I would have to have someone who was interested in children and had the physiologic and pharmacologic background to contribute to the anesthesiology of childhood. With the concurrence of I. S. Ravdin and Robert Dripps, Dr. Margery ("Margo") Deming came to us as our first pediatric anesthesiologist. To her I owe more than can be recounted in getting started in this new speciality in Philadelphia.

Many times Margo and I sat up at night at the bedside of a child who we thought might need a tracheostomy. We tried all manner of pharmacologic experiments in children who had difficult and poorly understood respiratory problems. We established the safety of endotracheal anesthesia in infants. We manufactured our own equipment. We did 1500 cases without a tracheostomy before reporting our work. After many years of faithful service and major contributions, largely unsung, to the field of pediatric anesthesiology, Dr. Deming resigned and Dr. Leonard Bachman came to found the first real division of pediatric anesthesiology at the Children's Hospital of Philadelphia. His entrance into politics resulted in Dr. Jack Downes being in command of what I think is the best group of pediatric anesthesiologists and intensive care specialists that can be found in the world today.

In those years, 1947 and 1948, medical patients who had surgical problems died on the wards of the Children's Hospital without even having a surgical consultation, although a simple surgical procedure could have saved their lives. I am referring to such conditions as simple duodenal atresia or malrotation of the colon. In those days the Children's Hospital was essentially a medical institution, in the narrow sense of the term. The nursing school of the Children's Hospital having been disbanded a few years before I arrived, we lost the special dedication that develops in such a setting. Nurses were not accustomed to the kind of care that we demanded for our post-operative patients and so the nursing was done poorly or not at all. The first day I scheduled ten patients in the operating room the entire operating room staff walked out. This year we shall do 9,000 operations in nine operating rooms.

Little by little we began to convince the pediatricians that we had something to offer them but at the Children's Hospital of Philadelphia there was great medical resistance to the specialty of pediatric surgery. When I speak of pediatric surgery in Philadelphia, I do not want to ignore the contributions of Drs. Samuel Cresson and George Pilling at St. Christopher's Hospital. But today is the birthday of the Children's Hospital of Philadelphia, and I limit myself to what I know best.

I was drawing the same salary that I had been drawing as a senior resident at the University Hospital — in those days a well paid job — at $1500 a year. My office expenses at Children's Hospital of Philadelphia for part-time secretarial help and rent for part of the office (which I was not given for over a year) came to $70 per month. I worked at the Children's Hospital for fourteen months before I grossed $70 in any one month.

It was the ubiquitous inguinal hernia that changed my financial fortunes. A patient had been admitted for a medical study. As the time for discharge approached, Dr. Andrew Hunt, assistant to Joseph Stokes, asked me to operate on this child for inguinal hernia. The child was discharged on the morning after operation. When Dr. Hunt called the referring physician, who happened to be the brother of Joseph Stokes, the latter was terribly upset because a patient was on his way home less than twenty-four hours after a surgical operation. He remarked that he knew nothing about removing

sutures or providing post-operative care. When Dr. Hunt told him that this patient was ambulatory, had no external sutures, and required no care whatsoever, Dr. Emlen Stokes was flabbergasted. He called me a week later and asked me if that operation was just a trick and whether I could do it again. When I told him that we could do it on as many patients as he could refer to us, he very gingerly began to send a patient or two. When he was convinced that the procedure was not a trick, he unloaded a huge backlog of children aged a few months to five years, all of whom were wearing trusses. The collection of trusses that accumulated during the next year made my office resemble a shrine like that at Lourdes.

One of my great supporters, a person without whom this whole endeavor could not have succeeded, was Dr. Doris Bender, who had been a junior resident when I was at the University of Pennsylvania. She remained at the Children's Hospital while I was in Boston and for an additional year-and-a-half after my return. Since we had little precedent to guide us, we did many things by trial and error, but with gratifying success.

One of my early residents was William B. Kiesewetter, who came to me in the fourth of five years of training at Yale. He later became my first associate and stayed with me for several years before going to the University of Pittsburgh and the Children's Hospital in that city to become its first academic surgeon-in-chief. Dr. Harry Bishop joined me when Dr. Kiesewetter left and is still with me as my most senior associate. A number of residents who were trained in this program stayed on for a number of years in practice with us before going elsewhere. Dr. Charles Minor was with us for perhaps the longest period of time before going to Wilmington, Delaware, to set up private practice in pediatric surgery. Dr. Paul Mellish is the chief pediatric surgeon at the University of Vermont in Burlington. Dr. Arie Verhagen is at the Children's Hospital in Dayton, Ohio. Dr. Dale Johnson is surgeon-in-chief at the Primary Children's Hospital in Salt Lake City. Dr. Louis Schnaufer, whom we trained more than twenty years ago, returned eight years ago after an interval spent in Baltimore. To those who have stayed on, Dr. Bishop and Dr. Schnaufer, we recently added Dr. John Templeton and Dr. Moritz Ziegler, both graduates of our training program.

We have graduated thirty-three men and women from the resident training program in general pediatric surgery; all but four are in the exclusive practice of pediatric surgery. The majority are academic chiefs of pediatric surgical services in children's hospitals or in hospitals associated with universities, where they direct divisions of pediatric surgery. These include the children's hospitals of Louisville, Memphis, Dallas, Pittsburgh, and Boston, the Mayo Clinic, Mount Sinai in New York, Duke University and the Universities of Arizona, Washington, and Oregon, and the former Philadelphia General Hospital.

When I began to work at the Children's Hospital of Philadelphia, I was a surgeon of the skin and its contents. It was my intention to have eventually the most comprehensive group of surgical subspecialists that could be gathered

under one roof. Because of the number of meningomyeloceles and problems of hydrocephalus, the first service to be added was neurosurgery. This was soon followed by urology. For too long we had itinerant surgery in cardiovascular surgery, but eventually developed a division in that area as well. Plastic surgery had existed at the Children's Hospital and dealt primarily with cleft lips and palates under that pioneer, Dr. Robert Ivy. Within four or five years after my arrival, the arrangement was changed and the Children's Hospital came to have individuals on the premises who devoted much of their time to this problem. An orthopedic service had existed when I came but it was part of a broader university program, as was the field of otolaryngology, presided over by individuals interested mainly in the problems of adults. With the establishment of a pediatric ophthalmology service at the Children's Hospital of Philadelphia ophthalmology was almost the last subspecialty to break loose from the parent discipline. Dentistry was added as an academic program centered in this institution two years ago.

It took thirty-three years to establish independent academic services in all the surgical subspecialties and to have them relate to each other in the Department of Surgery at the hospital. We are further united in the private practice of our specialties as a partnership known as the Surgical Associates of the Children's Hospital; there are twenty-eight partners and employed surgeons. There are in addition thirty-six paramedical and supportive associates.

General pediatric surgery divides itself quite readily into several categories. The greatest challenge lies in the management of congenital anomalies which are incompatible with life but amenable to surgical correction.

Operation upon such a youngster, who is often premature, demands the greatest surgical dexterity of any of the pediatric problems and necessitates most extraordinarily precise post-operative care, especially as regards the management of fluids and electrolytes, nutrition, and respiratory care. But the reward is great, since a life that is saved may be saved for seventy years. I refer to such things as omphalocele, where a youngster is born with his abdominal organs situated in the umbilical cord, to imperforate anus where a child is born without a rectum, to esophageal atresia where a youngster is born without an esophagus, to diaphragmatic hernia where an infant is born with his abdominal organs in the chest because of a rent in the diaphragm, and to a variety of forms of intestinal obstruction which are mechanical, chemical, and neural in etiology.

Diaphragmatic hernia provides the greatest challenge in speed; the youngest patient in this category that I ever operated upon was forty-five minutes old. The forty-five minutes had been spent in my driving to the Lying-In Hospital to transport the patient back to the Children's Hospital, where I operated without anesthesia. The greatest technical challenge lies in the repair of esophageal atresia, which I liken to sewing together the two ends of a divided piece of wet spaghetti in the bottom of an ice cream cone. The complexities of the operation and the post-operative care in the management of esophageal atresia provide a marvelous criterion by which to assess the

performance of a pediatric surgical service. No child with this anomaly had ever lived in Philadelphia when I went to the Children's Hospital in 1946. We have operated on 425 of these children since then and in the last eleven years no full-term patient has died; the survival rate for prematures is 88%.

Colon transplants for esophageal atresia, an innovation of the Children's Hospital of Philadelphia, have provided comfortable lives for innumerable children. Among the statistics that I find hard to believe is that we have never lost a child with colon transplant for this indication.

Among newborn children there are congenital defects which require the utmost skill and patience. A prime example is that of biliary atresia which, thanks to Dr. Morio Kasai, one of our disciples who is Professor of Surgery at Sendai, Japan, is now amenable to surgical correction in a way that never existed before. In addition there are situations peculiar to young children, such as the manifestations of Hirschsprung's disease or congenital megacolon, intestinal hemorrhage from defects such as Meckel's diverticulum or duplication of the bowel, and intussusception.

Perhaps the greatest challenge in pediatric surgery even to this day is the fact,on a service as busy as our own, never a month goes by without our seeing a new situation or a variation that we have never seen before. This not only makes life interesting but gives us the constant satisfaction that when we succeed in our management we have given a child a full life and a long one.

There have been welcome reversals: lesions which had a mortality of 90% in the 1940s now have a survival rate of over 90%. When I went to the Children's Hospital in 1946 cancer in childhood was seldom mentioned. The understanding of childhood cancer grew from pediatric surgery and then gave birth to the speciality of pediatric oncology which, in conjunction with surgical procedures, has resulted in what could even be called the conquest of such scourges as Wilms' tumor. The mortality of tumors such as rhabdomyosarcoma has been reduced. Unfortunately neuroblastoma, the most common tumor of childhood, has seen no alteration in mortality since 1955. The survival rate which we reported at that time has never been bettered in spite of a large effort by several institutions in the way of research, innovative surgery, and chemotherapeutic trials. Whoever succeeds in the management of neuroblastoma will hold the key to one of the great mysteries of cancer which could lead to its elimination.

The pediatric surgeon never knows when the ringing telephone will announce the arrival of an anomaly never before conquered. An example would be complete ectopia cordis, where the entire heart is outside of the body and the tip of the ventricle beats against the chin of the premature baby. Or it might be Siamese twins. The first of three pairs was separated when Dr. Schnaufer was my resident twenty-three years ago. Two beautiful normal girls were the result of the surgery. Unfortunately one of them died nine years later after open heart surgery. I went to the wedding of the survivor several years ago. The second set achieved international fame having come to us at the age of a year from the Dominican Republic, the famous Rodriguez twins, Alta and

Clara. The most complicated intertwining of anatomy of two young ladies was finally separated and reconstructed to produce two normal girls. Almost two years to the day after separation Alta inhaled a bean and asphyxiated. Clara survives as a fine young lady in the second grade of school.

The third set started off in tragic circumstances: there was one heart for two children. Both were dying of cardiac failure. The heart belonged to one; separation was necessary to save that child's life, but in the process the life of the heartless child would be sacrificed. The survival of a child so separated previously was fourteen hours. Our survivor lived forty-seven days before she died of unrelated hepatitis.

I have been emphasizing general pediatric surgery for two reasons. First of all, this is the field in which I have worked. Second, I have wanted to describe the way in which the speciality developed. Much of the story could be repeated for each division of surgery, not only as it has developed nationally, but especially as it has developed at the Children's Hospital of Philadelphia. In neurosurgery, urology, cardiovascular surgery, plastic surgery, otorhinolaryngology, ophthalmology, orthopedics, and dentistry there are individuals who in every way were just as much pioneers as I was in general pediatric surgery. They have developed the speciality nationally, have exerted an international influence, and have brought together in one group as inclusive an approach to pediatric surgery as exists anywhere.

I think of pediatric surgeons as very special persons. Constantly they face triumph and tragedy. Around the world they are my best friends. They are honed to a fine edge of surgical perfection and in their presence I am constantly embarrassed because I am untrained except by experience and there is no one I ever trained who does not know more than I do about the intricacies of care.

Conclusion

If I may be allowed a word of advice, I would say that children who have surgical problems would best be served by the establishment in medical schools of departments, not divisions, of pediatric surgery, co-equal with departments of surgery and departments of pediatrics. Pediatric surgery is a multidisciplinary speciality which cuts across anatomical specialities to serve an age group.

In a simplistic way I could summarize the differences between pediatrics and pediatric surgery by saying that a pediatric surgeon is a good pediatrician who knows how to operate.

I cannot think of a career in which I could have been happier or have had a greater sense of accomplishment, than I have had in pediatric surgery. Although it seems but a very short time ago that I associated myself with the Children's Hospital, it is a fact that in this oldest children's hospital in America, I have been surgeon-in-chief for more than a quarter of its existence. I have had a very happy marriage with pediatric surgery and with the Children's Hospital of Philadelphia. I wish the speciality well and I look forward to the continued

success of the Children's Hospital. Both of these wishes will come true as long as the speciality and the hospital put the care of children first.

The Rights of the Handicapped

I do not know what lies ahead for pediatric surgery. I have thought carefully how to state what I am to say. It is my personal opinion that since 1973, when abortion-on-demand became the law of the land, there came a process of the cheapening of human life in this country.

It has always been the goal of the medical profession to eliminate a disease process but to save the patient. Now abortion is easily available and what used to be called the sanctity of life is no longer considered a valid doctrine; and a congenital defect can be eliminated by destroying the unborn baby.

When the Supreme Court of the United States declared the unborn baby not to be a person, the fetus had no protection under the law. The most recent extension of that concept is to declare a newborn baby with congenital defect to be a fetus-ex-utero. When an imperfect child is delivered, the parents, with the cooperation of the physician, may decide not to feed that child, so that it does not survive. In the beginning this was an option in the case of children born with lethal lesions. More recently it has become an option in the management of children who are born with non-lethal defects that are difficult to manage and perhaps socially unacceptable. This practice I view as infanticide; at present it is more common abroad than it is here.

While our laws demand the expenditure of billions of dollars so that handicapped persons may have the same privileges and opportunities as the non-handicapped — laws of which I throughly approve — the mood of a growing number is to eliminate the handicapped before or after birth by either abortion or infanticide. If the present trends go unabated, the not too distant future may rule that the delivery of a defective child whose diagnosis could be made prenatally would be illegal.

I believe that every human life has value, and I believe that equality of life takes precedence over the quality of life. I look forward to the opportunity of serving as many infants and young children as I can.

Former Surgeon-in-Chief,
Children's Hospital of Philadelphia
and Professor of Pediatric Surgery,
University of Pennsylvania.

Dr. Thomas Bond of Philadelphia and His "Worm"

C. HELEN BROCK

IN a letter of 1 May, 1754, Thomas Bond of Philadelphia sent to Dr. John Clephane in London an account of an extraordinary case. The Society of Physicians in London, of which John Clephane was a member, had recently been formed, and at an early meeting of the Society Clephane read Thomas Bond's letter to them. It was subsequently published in the first volume of *Medical Observations and Inquiries*,[1] the journal of the Society.

Since my last, the following remarkable case has fallen under my observation. Mrs. Holt, a widow lady in this city, was, about 18 months before her death, affected with a pain in the right side, which in the beginning was like the stinging of a bee, or the pricking of a pin. This pain daily increased and gradually extended until it occupied a great part of the right hypochondriack region. It was at first in the side only, but after some months was felt alternately in the side and shoulder. Through the whole of her illness she had intervals of ease, these towards the latter end of her case were but short, and the pain was so encreased that she compared it to a bulldog gnawing her liver. After 9 or 10 months she thought there was something alive in her side, for (to use her own expression) she said she plainly perceived a tickling, and quirling in it. She rarely felt much uneasiness when in motion, particularly on horseback, but was most distressed when lying in bed. She accidentally discovered that a quick smart blow, struck with an open hand on the affected place, gave immediate relief, and therefore often called her sister to do it. If the pain was in the side when relieved by the the blow, it was usually felt next in the shoulder, and *vice-versa* if in the shoulder. The same remarkable thing arose from the application of a lixivial pultice to the side for the space of two weeks, during which time the pain was altogether in the shoulder, but again returned to the side soon after that medicine was removed.

In the place where the disorder began, which was about five inches from the spine, the ribs were gradually distorted, so as at length to form a considerable gibbosity; the teguments surrounding this part grew sore, the right side became oedematous, and a quantity of fluid matter could plainly be felt under the intercostal muscles.

A month before the patient's decease, the seat of the pain changed, it went in a direct line from the right to the left side, its motion was regular and slow, so that she did from time to time point out its progress; it was 4 days in passing over, afterwards fixed in the stomach, and was never more felt in the side, where the soreness of the teguments likewise soon abated.

The stomach had hitherto received, retained, and digested the food tolerably well, but was now affected with an incessant heaving and *nausea*, unless now and then relieved by strong opiates or large draughts of spirituous liquors; there was likewise the same sensation of tickling and *quirling* in it that had been before perceived in the side. She had a slight cough from the beginning of the illness; but after the pain came into the stomach, this cough was violent, and she expectorated large quantities of a viscid frothy phlegm. These symptoms all vanished suddenly, and, in 24 hours after, she voided by stool the forepart of an annular worm 9 inches long, and an inch in diameter; and in six hours more, the tail and other parts of the body, amounting in the whole to 20 inches in length. It was of a red colour and filled with blood in the manner of a leach. After the worm left the stomach, Mrs. Holt complained that the stomach was fallen down, and seemed very empty, and she entirely lost the power of

deglutition; so that she did not survive above 48 hours. Whilst the pain continued in the side she had a considerable degree of flesh and strength remaining, but languished fast after it came into the stomach.

This unhappy gentlewoman was for many months before her death so fully convinced of there being something extraordinary in her case, that she insisted on having her body opened, and the nature of her disease carefully inquired into: which was accordingly done by Doctors Kearsely senior, Shippen, Phineas Bond, and myself, in the presence of many of her friends. We found the liver inlarged and forced over to the left side, the substance of it harder than common, and in some parts actually scirrhous; the gall-bladder distended with thick black bile to the size of a goose-egg, the stomach and intestines in a natural state, the liver adhering to the *peritonaeum*. In the external part of the liver under the distortion of the ribs was a large cavity containing near two quarts, filled with bloody water, and a few lumps of coagulated blood; the surface of the liver within it appeared jagged and uneven as if it had been gnawed: on the side of this cavity was a chamber two inches in diameter, and in the bottom of it a passage leading into the hepatic duct; the mouth of this passage was pursed up, and appeared to have been considerably large. On laying open the *duodenum*, we found the perforation of the biliary ducts into it so dilated, as readily to admit the end of a common tallow candle: there was not here or in the neighbouring parts the least tinge of bile, nor did it flow easily by pressure on the gall-bladder, though we could not discover anything in the passage to obstruct it.

From the above symptoms, and the appearance of the parts on dissection, there seems little room to doubt, that from the time of Mrs. Holt's complaining of the pain in the right side, until it moved to the left, this horrid animal had its seat in the cavity we found in the liver; that afterwards it worked its way from thence into the stomach, and there continued 'till twenty four hours before it was voided; and I think we may reasonably conjecture, that, when very small, it was taken into the stomach, and, passing over the *pylorus*, entered the biliary ducts, and pursued one of the branches of them as far as it could go, then formed its bed, and was nourished by sucking the blood, until the morbid state of the juices, or the nauseous applications used externally to her side made its situation improper; after which it returned through the same passages that had given it admittance.

...The fore part of this worm was thrown away, before I had an opportunity of seeing it; but from the description her sister and the nurse gave of it, and the resemblance the remainder bears to that described by Mr. Paisley, in the Edinburgh Medical Essays, they appear to be exactly of the same kind; I have, therefore, sent you the tail to supply the defect of his figure.

...I think this worm may justly be called an hepatic leech. If my memory does not deceive me, worms of considerable size have been found in most parts of the human body, and the same species usually in the same places; yet many of them remain, till it is too late, *morbi incogniti*; I think this must be for want of accuracy in observation. Animals of the same kind, and in the same situation, must produce a sameness of effects and symptoms, which might be known to the advantage of the patient, and reputation of the physician. The singularity of this case gave me great perplexity; it was at first considered as an obstruction of the liver, and deobstruents prescribed; the gentler failing, recourse was had to a ptyalism raised by the *unguentum coeruleum* rubbed over the part, mercurial plasters, and small doses of calomel by the mouth. Towards the end of this course, the worm was scarcely felt for some weeks. When we perceived matter under the intercostal muscles, we advised laying the parts open, but the patient would not submit to it.

Thomas Bond's letter is followed by one from Mrs. Holt's sister, Sarah Browne, to Benjamin Franklin. While the letter seconds much of Dr. Bond's account, it does add several graphic details and interesting information. The

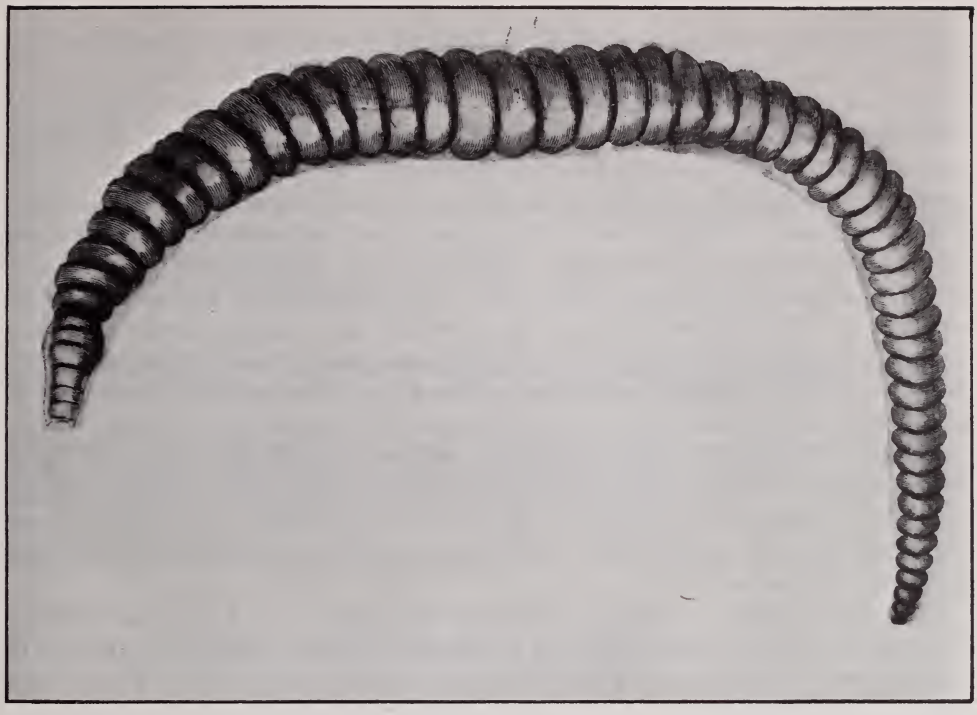

Figure 1.
Drawing of Dr. Thomas Bond's "Worm", from Plate II of *Medical Observations and Inquiries by a Society of Physicians in London* 1 (1757).

Figure 2.
Dr. Thomas Bond's "Worm" as it appears today in the Museum of Pathology, Royal Infirmary, Glasgow.

pain under Mrs. Holt's shoulder blade became so severe after ten months that she would beg Sarah "to pound her back, or shoulder, which I did for 10 or 15 minutes at a time, and slap'd her side." Sarah Browne described some of the steps taken by Dr. Bond to treat his patient; in addition to bleeding, blistering, "a course of physic", and an array of medicines "too tedious to relate", Bond prescribed a highly successful and soothing poultice "made of rye-meal, honey, and Castile soap." When the "worm" entered her stomach, Mrs. Holt became convinced that her end was near, "call'd for all her friends, and took leave of them in a most affectionate manner"; "The agonies she was in cannot be express'd." Nothing would stay in her stomach save "strong brandy or geneva punch; and nothing would give any tolerable ease, except strong anodines." She continued in this state for three weeks, after which "she voided by stool the first of a worm; and about four in the afternoon that part which you saw."[2]

With Bond's letter came the actual "worm". A drawing was made of it, possibly by Jan van Rymsdyk, as it occurs (Fig. 1) on Plate II of the first volume of *Medical Observations* alongside a figure of a child whose abdominal viscera were chiefly in the cavity of the thorax, which had been drawn for Dr. George Macaulay by that artist.

Clephane, having no use for the specimen, gave it to his friend William Hunter, who was already building up a collection of anatomical preparations. In contemporary catalogues[3] of the collection it was specimen "Q20. Worm from America (doubtful)".

For twenty-nine years the specimen remained in London under William Hunter's care, and for a further twenty-four years under the care of Hunter's nephew, Matthew Baillie, and William Cruickshank who were left, by William Hunter, the use of his Museum for thirty years so that they could continue the teaching of anatomy in London, after which the collections were to go to Glasgow University. Cruickshank died in 1800 and by then Baillie had given up teaching anatomy, and, as Glasgow University was very anxious to obtain the anatomical preparations, the collections, including the "worm", in 1807 were moved to Glasgow. The specimen has survived further moves: in 1870 from the old Hunterian Museum to the new University buildings on Gilmorehill on the edge of the city of Glasgow, from the Hunterian Museum to the Museum of the University Anatomy Department in 1900 and from the Anatomy Department of the University to the Museum of the Pathology Department of the Glasgow Royal Infirmary in 1954, where it is now Specimen 36.15 (Fig. 2). When John Teacher recatalogued the collection[4] in 1900 he described the specimen not as a worm but as

> Fibrous cast of the intestine passed per anum.
> Haemorrhage from the liver

and suggested that the causative disease was a large hydatid of the liver, and this description survives in the new catalogue of the collection.[5]

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5. Marshall, Alice J. and Burton, J.A.G. 1962. *Catalogue of the Pathological Preparations of Dr. William Hunter, Sir William Macewen, Professor John H. Teacher and Professor J.A.G. Burton in the Museum of the Pathology Department, Glasgow Royal Infirmary*, pp. 243-47. Glasgow.

DOCUMENT

The following letter to Dr. Edward Bell Krumbhaar from Dr. Theobald Smith was located recently among the papers of the late Stuart Mudd, M.D. and presented to Transactions & Studies *by his widow Emily Mudd, Ph.D.*

The Rockefeller Institute
for Medical Research
Department of Animal Pathology
Princeton, NJ

October 11.33

Dear Doctor Krumbhaar:

As we grow old we come to the end of our individual era in which we have tried to do our part. We begin to realize the important function of the past in shaping the future. We also feel the at times benumbing and soporific effects of that past to be gotten rid of.

It is not uncommon for the younger generation to criticise or even disregard earlier work because it is not complete from the near recent standpoint. No research will answer all queries that the future may raise. It is wiser to praise the work for what it has accomplished and then to formulate the problems still to be solved. It is not profitable to enter into controversies especially with those working in another geographic area or continent unless the material on which their researches are based has been examined.

To those who have the urge to do research and who are prepared to give up most things in life eagerly pursued by the man in the street, discovery should come as an adventure rather than as the result of a logical process of thought. Sharp prolonged thinking is necessary that we may keep on the chosen road but it does not itself necessarily lead to discovery. The investigator must be ready and on the spot when the light comes from whatever direction.

There are many to compete with the young investigator. Opportunities for research have been increased a hundredfold in the past half century. More and more our colleagues fail to understand our work because of the high specialization of research problems. We must not be discouraged if the products of our labor are not read or even known to exist. The joy of research must be found in doing since every other harvest is uncertain and even the prizes do not always go to the discoveries to which we would assign them. Research has deserted the individual and entered the group. The individual worker finds the problem too large, not too difficult. He must learn to work with others.

In bacteriology and pathology research is slowly receding from the ultrapractical point of view of the early leaders. One group thought it possible to catch all bacteria in transit from one victim to another and to suppress disease in this way. Another group thought that a vaccine could be prepared for every disease. We have learned much since then and have become quite humble. Our researches no longer lead straight to Public Health regulations. They are more elusive and difficult to fit into any scheme for decreasing the incidence of disease. We must be content with the vision of future usefulness. In general, a fact is worth more than theories in the long run. The theory stimulates but the fact builds. The former in due time is replaced by one better but the fact remains and becomes fertile. The fertility of a discovery is perhaps the surest measure of its survival value. What is one man's meat is another's poison in research as in other vocations. Temperament goes far towards deciding our course. In the three different environments in which I have spent my active life I have always taken up the problems that lay spread out before me in the new environment, chiefly because of the accessibility of material without which research cannot go on for in the early years material and resources were exceedingly scant and this meagerness determined the direction and scope of all research. My interest in a problem usually lagged when certain results could be clearly formulated or practically applied. To continue and analyze still further every link of the established chain either failed to hold my interest or was made difficult or impossible for causes lying outside the problem. As I look back it is precisely these links that have provided innumerable problems to others. Each link has grown into a chain and the end of successive chain making is not in sight.

Sincerely yours,
Theobald Smith

ESSAY - REVIEW

The Seats and Causes of Diseases Investigated by Anatomy. Translated from the Latin of John Baptist Morgagni by Benjamin Alexander, M.D. With a preface, introduction and a new translation of five letters by Paul Klemperer, M.D. Facsimile of the London, 1769 edition. Reissued: New York, Futura Publishing Co., 1980. 3 volumes: xxxvii, xxxii, 868; vi, 770; vi, 604, [clii] pp. $85.00. Reviewed by SAUL JARCHO, M.D.

IN 1761 the Remondinian Press of Venice published Giambattista Morgagni's immortal study of mortality, the *De Sedibus et Causis Morborum per Anatomen Indagatis.* As its title indicates, this classic work describes the effort to use gross dissection in order to ascertain the loci from which symptoms originate and at the same time to ascertain the causes. Like *Pamela, Clarissa Harlowe,* and some other eighteenth-century novels, the text is presented as a series of letters. In arranging his material Morgagni used a very old system, found also in the Edwin Smith Surgical Papyrus and summarized in the phrase *a capite ad calcem* — from head to foot. On this plan he devoted book I to diseases of the head, book II to diseases of the thorax, and book III to the abdomen. Book IV considers surgical and general diseases. Book V, one of this world's most valuable scrapbaskets, contains miscellaneous addenda.

It is well to note that to Morgagni the Latin word *morbus* was not precisely equivalent to the present-day English word *disease.* This is shown by the chapter headings in the *De Sedibus.* In book I for example, these refer successively to headache, apoplexy, phrenitis, madness, melancholy, hydrophobia, and so on. By twentieth century criteria such a series is not a list of equivalent or parallel categories but a mixed bag of symptoms, lesions, syndromes, and unknowns, for which Benjamin Alexander used the elegant term *disorders.*

Morgagni's list tells us two things — first, that in his time the distinction between symptom and disease had not reached its present state of development, and second, that in his investigation he usually started with the symptom or the complaint and tried to dissect his way to the explanation.

The arrangement of the individual discussions is both noteworthy and attractive. In taking up most subjects Morgagni usually started with a conscientious and amply footnoted review of the literature, beginning with ancient authors and including both medical and non-medical writings. After this he usually described cases that he had found in the notes of his teacher Valsalva, and then he would describe his own; in effect he was thus regaling the reader with the harvest of two lifetimes. He then would analyze and discuss the accumulated series, with emphasis on an effort to discern common elements which might favor or exclude one cause or another. An excellent example of the analytical method is found in the chapters on apoplexy, which

are discussed and tabulated in the December 1980 issue of *Transactions and Studies.*[1]

Since Morgagni lived long and worked hard — the *De Sedibus* forms less than two-fifths of his published writings if one remembers to take into account the autobiographies — his accumulated experience was very great and his path is marked by numerous eponyms. Yet he is not considered a great discoverer; his large merits lay in the realm of synthesis rather than major innovation.

In 1769, A. Millar and T. Cadell published in three quarto volumes the English translation of the *De Sedibus* that had been prepared by Dr. Benjamin Alexander (ca. 1736-1768), an Irish physician who, according to William Munk's *Roll of the Royal College of Physicians of London*,[2] had studied in Leyden and London. The dedicatory letter to Dr. John Fothergill of London opens with the statement that "the great excellence, and usefulness, of the work which I have attempted to translate, claims a patronage from the most eminent physicians." Dr. Alexander was an adequate prophet, and in time his edition became something of a rarity in the market.

In the special Translator's Preface Alexander offers some brief and valuable comments on medical vocabulary, medical style, and medical education. He also complains about Morgagni's difficult rhetoric, and the objection will be sustained by anyone who attempts the penitential task of translating Morgagnian prose, for example the *Consulti.*

About 30 years ago the library of a large eastern medical school circulated a list of duplicates that it was offering for sale. The *De Sedibus* was quoted at fifty dollars. Could this have been a typographical error? Was the price intended to be one hundred and fifty? But even fifty seemed a large sum. At the end of three days avidity overcame frugality, but a long-distance telephone call revealed that the book had been sold.

In 1956 my wife was contemplating a major gift to mark a major birthday. The news that she sought to honor her husband with Alexander's *De Sedibus* spread along the librarians' powerful grapevine and reached London, where the lamented Dr. Noel Poynter happened to be entertaining a notorious New York bookdealer. The latter, on recrossing the Atlantic, offered the book to my wife for *two hundred and forty-five.* She refused — furiously and icily. Not long afterward, at a meeting of medical historians, a New England cardiologist whom I had known for more than twenty years told me proudly that he had bought Alexander's *De Sedibus.* When I guessed that he had paid two hundred and forty-five dollars, his astonishment was limitless.

1. S. Jarcho, "Some Lost, Disappeared, or Discontinued Diseases: Serous Apoplexy, Incubus, and Retrocedent Ailments," *Trans. and Studies Coll. Phys. Phila.*, 5th ser. 2 (December 1980): 241-66.

2. W. Munk, *The Roll of the Royal College of Physicians of London,* 2nd ed., (London: Royal College of Physicians, 1878) 2:270.

These incidents had several consequences. First, I determined to write an essay to be titled, approximately "Bookdealers as an Obstacle to Scholarship" but one of our country's leading medical librarians proved dissuasive — wisely. Second, she and I, independently and simultaneously, determined to urge the reprinting or republication of Alexander's translation. The result of these efforts was issued in 1960, under the auspices of the New York Academy of Medicine (whose Library Publication Committee includes the present reviewer) as No. 13 of its historical series, and was published by Hafner in a handsome three-volume facsimile, to which the revered Dr. Paul Klemperer (1887-1964) contributed a prefatory note, a six-page introduction, and translations of the letters which Morgagni had written — to Christoph Jacob Trew, William Bromfeild,[3] Pierre Senac, Johann Friedrich Schreiber, and Johann Friedrich Meckel — as introductions to the five successive books of the *De Sedibus* but which Alexander had neglected to include.

It is estimated that the Hafner facsimile was issued in a press-run of less than a thousand copies, priced at forty dollars. This was clearly a higher price than most people then paid for most new books, yet the non-commercial venture, inspired in part by the rapacity of the aforementioned dealer, proved to be a commercial success. Before many years had passed, all the copies were sold. The facsimile of a rarity had become a rarity on its own account.

Late in 1980 the Library Publications Committee of the New York Academy of Medicine favored the learned world with a reissue of the Alexander facsimile, published by the Futura Publishing Co. The new volumes have blue covers (a change from the tan of the earlier facsimile) and a strengthened binding. The facsimile does justice to the large lettering of text and footnotes, the ample interlinear spacing, and the adequate margins, all of which combine with the stately eighteenth-century English prose to maintain undiminished the attractiveness and usefulness of a work that is now well entered into its third century. The price is eighty-five dollars, distinctly less than the pathologic condition of United States currency would have led one to expect.

Those who enjoy the *De Sedibus* are apt to reread first the famous cases of aortic aneurysm in Letters 17 and 18, but it is well to go back to Letter 15, which starts Book II, and to read about dyspnea ("respiration being injur'd"), and then to read successively about suffocation, spitting of blood, preternatural pulses, "lypothymia", and sudden death, which provides an appropriate end to the second book.

3. Bromfeild or Bromfield? Morgagni's Latin original and his *Opera Omnia* give the former, as does the author-catalogue of the New York Academy of Medicine. The volumes under review, and their predecessor of 1960, give the latter, as does the *Dictionary of National Biography*. Munk's *Roll* is silent. The best evidence exhumed thus far is provided by title-pages. See *Chirurgical Observations and Cases* by William Bromfeild (London: Cadell, 1773) and *An Account of the English Nightshades, and their Effects...* by William Bromfeild (London: Baldwin and Woodfall, 1757).

The other books are not devoid of magnetism. One need only mention "Of the Descent of the Uterus; and of the Ascent thereof, as the Women call it" (Letter 45); "Of starving to death" (Letter 28); and Letters 34 and 35 "Of the Pain of the Intestines." The last-mentioned records a memorable consultation held in 1703 with Ippolito Francesco Albertini in which that excellent Bolognese clinician described the early signs of the acute abdomen. This passage is in Letter 21, paragraph 7, which is at pp. 178 and 179 in volume II of the handsome Alexander translation.

Perhaps these examples will beckon to the young or the susceptible, leading them to successive and ever-increasing pleasures — like the signpost at the Los Angeles airport, which leads you onward to Hawaii, where another signpost points to Tahiti and Papeete.

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John Whitridge Williams and Academic Obstetrics in America

LAWRENCE D. LONGO

DURING the first three decades of the twentieth century the specialty of obstetrics and gynecology as taught in medical schools changed from an empirical, technical craft to an academic discipline. John Whitridge Williams, Chairman of the Department of Obstetrics at the Johns Hopkins University School of Medicine from 1899 to 1931, was the person principally responsible for this change. In addition, Williams served as dean of the Johns Hopkins Medical School from 1911 to 1923 and in that role influenced academic medicine profoundly during the post-Flexnerian era. Williams became the most influential teacher of obstetrics in North America; his *Obstetrics* became the leading textbook in the field. He also trained the men who headed many of the departments of obstetrics and gynecology in medical schools during the first half of this century. He made important contributions to the science of obstetrics, especially as regards pathophysiology. In addition, he worked to educate professional persons and laymen in the importance of prenatal care and he strove to reduce the appalling perinatal and infant mortality which existed during the early part of this century.

Williams presented a paradox. He exerted wide influence on medical education in general and on academic obstetrics in particular, at his own institution as well as throughout the country, yet he is one of the least known of the early physician-educators of the Johns Hopkins School of Medicine. While innumerable papers and volumes have described the contributions of his contemporaries William Henry Welch, William Halsted, William Osler, Howard A. Kelly, and others, John Whitridge Williams, although highly regarded by his colleagues in America and Europe, has been the subject of almost no scholarly study.

In this paper I shall consider several of Williams' most important contributions: (1) his influence in teaching of obstetrics at the Johns Hopkins University and throughout North America, (2) his role in the development of academic departments of obstetrics and gynecology, (3) his contributions to obstetrical pathology, and (4) his role in the development and popularization of prenatal care. In addition, I shall examine the way in which his style and character influenced his work.

Biographical Background

Williams was born on 26 January, 1866 in Baltimore, Maryland, the son of Philip C. Williams (1828-1896), a distinguished physician, and Mary Cushing Whitridge Williams. Many members of his family for several generations in New England on his mother's side and in Virginia on his father's side had been professional men. He was a born aristocrat and a medical career seemed to be his right, a bequest from progenitors who had practiced medicine in America for more than 160 years. His maternal great-grandfather, William Whitridge of Rhode Island was a chemist and the recipient of honorary degrees from Harvard and Yale. His paternal forebears included many distinguished physicians and lawyers in a family which had been among the leaders in the Continental Army during the American Revolution.[1]

In 1884, at the age of eighteen, Williams entered Johns Hopkins University. He was graduated two years later with a Bachelor of Arts degree. Among his classmates was Abraham Flexner, with whom he would later be associated in the reform of American medical education. He entered the University of Maryland Medical School and took the six-months lecture course, which was repeated during the second year, as was the custom of the times. After two years he was graduated but took no internship. Instead he left immediately for Vienna and Berlin, where he studied pathology and bacteriology.[2]

In 1889 he returned to Baltimore to join Howard A. Kelly, the professor of gynecology and obstetrics, as voluntary outside assistant (resident). During the morning he assisted with gynecologic operations; he would spend the afternoons in the pathology laboratory of William Henry Welch. Originally it was Williams' intention to pursue a career in diseases of women and for this purpose he devoted himself to gynecologic pathology. In 1891 he married Marguerita Stewart Brown, the daughter of a general in the U.S. Army. The following year at the age of 26 he was elected to membership in the American Gynecological Society, the youngest person ever so

1. Howard A. Kelly, "John Whitridge Williams (1866-1931)," *Amer. J. Surg.* 15 (1932): 169-174; also published in *J. Obstet. Gynaec. Brit. Comm.* 39 (1932): 103-6.

2. Ibid., p. 171.

honored. His admission to membership was based on his studies of ovarian neoplasms and pelvic tuberculosis. In 1893 he was elevated to the rank of associate in obstetrics at Johns Hopkins.[3]

In 1894, because of an increasing number of opportunities in the field of obstetrics at Johns Hopkins University, Williams again took further training. He worked first in Leipzig, then in Prague, and later in Paris. After one year he returned to Baltimore and in 1896 became associate professor of obstetrics.

In 1899, in recognition of his developing reputation as an academician and his scholarly contributions, Williams was invited to head the Department of Obstetrics at the University of Chicago Medical School. Howard A. Kelly, recognizing that the departure of Williams would entail a great loss to the university, and desiring to concentrate more completely on gynecology, decided to turn obstetrics over to Williams. Thus, at the age of 33 Williams became professor of obstetrics, and obstetrician-in-chief of the Johns Hopkins Hospital. He returned to Germany in 1909, where he spent a sabbatical year working in biological chemistry at the University of Heidelberg. Williams was a great admirer of the German universities and Frauenkliniks, and in subsequent years he spent time abroad almost every summer. After the retirement of Dean William H. Howell, Williams served as dean of the medical school for twelve years (1911-23). In 1919 the Department of Obstetrics became the first full-time obstetrical department in the United States.[4]

Williams must have been a commanding figure. Alan Guttmacher, who trained with Williams as a student during the 1920's, described him as a large, dignified, handsome man — well over six feet tall (Fig. 1):

> His huge head, with its big, virile features, was made even more manly by a heavy, nicotine bleached, drooping moustache. His moustache was much fairer than his hair, which was dark brown . . . As he sat before his class, he would look over the top of his eyeglasses, bending his large head on a thick, powerful neck. This gave him a very formidable appearance so that the students aptly nick-named him 'The Bull'. This comparison to Taurus was further enhanced by a

3. Ibid.

4. Ibid., pp. 171-172.

> deep rumbling voice. Furthermore, he was very strong and vigorous and the force of his sneeze, in which he had peculiar pride, fairly rocked the building.[5]

He has been described as a dynamic teacher, popular with students both as professor of obstetrics and as dean. At the same time he was unassuming and retiring. In October 1931 the Royal College of Obstetricians and Gynaecologists elected Williams to honorary fellowship, one of the first three such honorary awards given. A few days later, on 21 October, he died — slowly exsanguinating from a gastric ulcer.[6]

This, then, is a precis of his biography. Let us now consider Williams' substantive contributions to the development of academic obstetrics and to general medical education.

Medical Education in Obstetrics

The Teaching of Obstetrics at the Johns Hopkins School of Medicine

Williams' pedagogic convictions were drawn largely from his experience in European universities, which encouraged initiative of thought and action. Because of his concern with the poor state of obstetrical practice, Williams was intensely interested in medical education, especially the teaching of obstetrics. He presented his credo in a paper prepared for the Association of American Medical Colleges:

> There are very few institutions in which it is attempted, in connection with the obstetric course, to give practical laboratory instruction

5. Alan F. Guttmacher, "Recollections of John Whitridge Williams," *Bull. Hist. Med.* 3 (1935): 19-30.

6. Ibid.; Kelly (n. 1), p. 174; anonymous, "John Whitridge Williams," *JAMA* 97 (1931): 1317; C. Berkeley, "In Memoriam, John Whitridge Williams, 1866-1931," *J. Obstet. Gynaecol. Brit. Comm.* 39 (1932): 106-8; H.M. Little, "In Memoriam — John Whitridge Williams, 1866-1931," *Trans. Amer. Gynec. Soc.* 57 (1932): 333-36; H.J. Stander, "In Memoriam — John Whitridge Williams, 1866-1931," *Amer. J. Obstet. Gynec.* 22 (1931): 3-5, also published in *J. Obstet. Gynaec. Brit. Emp.* 39 (1932): 100-2; D.N. Danforth, "Contemporary Titans: Joseph Bolivar DeLee and John Whitridge Williams," *Amer. J. Obstet. Gynec.* 120 (1974): 577-88; A. McGehee Harvey, "John Whitridge Williams — His Contributions to Obstetrics," *Johns Hopkins Med. J.* 138 (1976): 96-101.

> upon the anatomy and pathology of the female generative organs, and of the various diseases which may complicate the pregnant, parturient, and puerperal condition, by which the student may gain an intelligent idea concerning the structure of the organs with which he has to deal, and of the morbid changes in the various diseases, which he may be called upon to treat. Unless such practical instruction is added to the theoretical teaching and the practical work in the lying-in ward, we cannot consider that the student has received a well-rounded course. And it will not be until our schools equip and maintain obstetric laboratories that we can expect our students to have an accurate conception of many of the conditions with which they have to deal.[7]

Regarding lectures, he wrote:

> If the teacher simply bases his lectures upon Lusk or some other standard text-book, we believe that he will best subserve the interests of his students by abandoning them . . . If, however, he has higher aspirations than simply to rehash a standard text-book, and is able to avail himself of the recent English, French, and German literature, we believe that the didactic lecture will still play an important part in obstetric instruction . . . The lectures should be accompanied by as many demonstrations as possible.[8]

He taught a particular topic, such as eclampsia, by presenting in detail the conflicting theories of its etiology and then interrogating the students about their ideas. Two decades later he recalled:

> Since beginning my teaching career . . . one of my most important duties has been to follow critically every advance suggested in obstetrics, whatever its character, for the purpose of determining upon how solid a foundation it rests, and whether its adoption should be recommended to students.[9]

Rather than simply lecturing, Williams would assign the students a chapter in his textbook to read in advance; then during the class period, he would question them individually. Guttmacher recalled

7. John Whitridge Williams, "Teaching Obstetrics," *Bull. Amer. Acad. Med.* 3 (1897-98): 409-420, p. 409.

8. Ibid., p. 410.

9. John Whitridge Williams, "A Criticism of Certain Tendencies in American Obstetrics," *N.Y. State J. Med.* 22 (1922): 493-99.

Fig. 1. John Whitridge Williams at his desk

that he stressed the unknown as well as the known.[10] Williams himself noted:

> A recitation hour should be interpolated between every third or fourth lecture, and the student questioned not only upon the work immediately preceding the recitation, but upon the work so far as it has been covered . . . The students should be encouraged to ask questions freely, and the recitations should be conducted as informally as possible . . . The recitation is almost as important for the teacher as for the student, in that it enables him to impress upon the latter the important parts of the work, and frequently enables the former to see how very imperfectly he has succeeded in rendering his meaning clear. The recitations should therefore be conducted by the teacher himself and not be delegated to one of his assistants.[11]

Williams believed in preparing students as carefully and rigorously as possible for their clinical responsibilities:

> Exercises upon the manikin should form an integral part of the obstetric course; but their scope should depend to a great extent, upon the amount of material which is available for clinical instruction . . . if the clinical material is limited in amount, we consider it advisable that the students be taught the rudiments of palpation, touch, and pelvimetry upon the manikin, so that they will know exactly what they are to do when they examine the patients in the wards, whereby clinical material is economized, and the patients saved considerable annoyance.[12]

In his teaching Williams stressed pathology, since he believed that unless students were intimately acquainted with the minute structure of the reproductive organs and the pathologic complications of pregnancy and the puerperium, they could not understand the subject. He even listed about sixty specific pathologic conditions with which the students should be familiar.[13]

Apparently the planners of the Johns Hopkins Hospital structure did not provide for the delivery of obstetrical patients. When the

10. Guttmacher (n. 5), p. 24.

11. Williams (n. 7), pp. 410-11.

12. Ibid., p. 411.

13. Ibid., pp. 413-15.

requirements of the medical school demanded obstetrical facilities, an obstetrical ward was fashioned by erecting a brick wall across part of the isolation pavilion.[14]

Williams continued the pioneer efforts of James Platt White, who arranged for students to participate in deliveries. Williams wrote:

> A small number of students, preferably two, but certainly not more than four, should be called to the ward to see every case of confinement. They should be required to examine the patient, both internally and externally, once during the first and again during the second stage of labor. In uncomplicated cases, one of the group should deliver the woman himself, under the guidance of a competent assistant.[15]

By this time home deliveries by medical students had become an accepted part of the curriculum, but most schools sent students, unaccompanied, to attend the patients. Believing that this experience should be supervised, Williams sent along a graduate physician and nurse, even though the student was directly responsible for the delivery.[16]

Williams also had students participate in weekly clinical case conferences for practical instruction. This was an innovation.

> During the fourth year there should be a weekly meeting of the class, in which most of the teaching should be done by the students themselves.... A student, who has lately seen an interesting case ... should read a concise history of the case, and then perform upon the manikin the operation which may have been required. The case is then discussed by the instructor, and the class questioned ... At another meeting, a dead-born child and its placenta may be exhibited. Two students may be called upon to perform an autopsy upon the child and to ascertain its cause of death; to a third student the placenta may be given, with instructions to tease out some villi, examine them under the microscope, and ascertain if they present syphilitic lesions....

14. J. Morris Slemons, *John Whitridge Williams, Academic Aspects and Bibliography* (Baltimore: The Johns Hopkins Press, 1935) 4.

15. Williams (n. 7), p. 417.

16. Ibid., pp. 417-18.

> Then the diagnoses are called for, and the history read by the student, who observed the case, and it is attempted to bring the clinical history into accord with the anatomic findings and *vice versa* ... Another very practical manner of spending the hour, is to take three deformed pelves and give each one to a group of students with a pelvimeter and a piece of paper. Allow them 15 minutes to measure each pelvis. Then call upon one student in each group for the diagnosis, his reasons for making it, and the measurements upon which it is based. And ask the other how he would diagnose a similar pelvis in the living woman, and what procedures he would adopt to deliver her, etc.[17]

In a reconsideration of this topic, Williams discussed examinations. In addition to scores from written tests, he included assessment of the student's recitations, performance in class and on the wards, and reports of home deliveries. He observed:

> The final examination should be conducted at the bedside or with the manikin, and an attempt to test the practical knowledge of the student. At the same time, questions should be asked of such a character as to give some idea of his powers of reasoning, instead of how well he can memorize a textbook.[18]

Williams stressed the historical evolution of concepts, and on quizzes he reserved the highest grades for those who knew not only facts but also their sources.[19]

Kelly later recalled that Williams "ever sought to impress upon his students that the purpose of their training was to train others in turn, and to this end he fostered their educational interests to the utmost." Several of his former students have stated that in the 1920s Williams was the most popular and best teacher in the medical school. He presented a celebrated course in anecdotal midwifery, recounting an inexhaustible supply of stories in Rabelaisian vein.

17. Ibid., pp. 418-19.

18. John Whitridge Williams, "Teaching Obstetrics," *Philadelphia Med. J.* 6 (1900): 395-99, p. 399; in addition see J.W. Williams, "The Introduction of Clinical Teaching of Obstetrics in the United States," *Amer. J. Obstet.* 50 (1904): 302-21; J.W. Williams, "Teaching of Obstetrics and Gynecology," *JAMA* 76 (1921): 872.

19. Slemons (n. 14), p. 8.

Gertrude Stein is said to have withdrawn from the Medical School rather than attend Williams' lectures, which she found offensive.[20]

Textbook of Obstetrics

During the late nineteenth century, American textbooks of obstetrics were inadequate. The three American books most commonly used were *The Science and Art of Midwifery* by William Thompson Lusk, Theophilus Parvin's *The Science and Art of Obstetrics*, and *A System of Obstetrics, by American Authors*, edited by Barton Cooke Hirst. All were descriptive accounts which failed to present what was known of the pathophysiologic fundamentals. By the turn of the century they were out of date.[21]

In 1903, Williams, recognizing the lack of a complete and authoritative textbook, published his *Obstetrics: A Textbook for the Use of Students and Practitioners* (Fig. 2). In view of his many responsibilities in teaching, practice, research, and administration, it is difficult to understand how he found time for the vast amount of reading and thought that he invested in this amazing work.[22]

In the preface Williams observed that he had "attempted to set forth as briefly as seemed to be consistent with thoroughness, the scientific basis for and the practical application of the obstetrical art." The textbook contained this and more. Each chapter presented a thoughtful analysis of the subject rather than a mere compilation of the writings of others. It also included a historical review, with "such references to the early history as well as to the most recent advances in each subject, as to enable the student to refer readily to the most important original sources," noting that in order to insure accuracy, he had "in every case" read the original articles. Williams dedicated his *magnum opus* to his mentors in pathology, William

20. Guttmacher (n. 5), p. 22; Erle Henriksen, personal communication, 27 July 1979; Richard W. Te Linde, personal communication, 28 June 1980.

21. Barton Cooke Hirst, *A System of Obstetrics. By American Authors.* 2 vols. (Philadelphia: Lea Bros., 1888-89); William Thompson Lusk, *The Science and Art of Midwifery* (New York: D. Appleton, 1882); Theophilus Parvin, *The Science and Art of Obstetrics* (Philadelphia: Lea Bros., 1886).

22. J.W. Williams, *Obstetrics: A Textbook for the Use of Students and Practitioners* (New York: D. Appleton, 1903).

OBSTETRICS

A TEXT-BOOK FOR THE USE OF STUDENTS AND PRACTITIONERS

BY

J. WHITRIDGE WILLIAMS

PROFESSOR OF OBSTETRICS, JOHNS HOPKINS UNIVERSITY; OBSTETRICIAN-IN-CHIEF TO THE JOHNS HOPKINS HOSPITAL; GYNÆCOLOGIST TO THE UNION PROTESTANT INFIRMARY, BALTIMORE, MD.

WITH EIGHT COLOURED PLATES AND
SIX HUNDRED AND THIRTY ILLUSTRATIONS IN THE TEXT

NEW YORK AND LONDON
D. APPLETON AND COMPANY
1903

Fig. 2. Title page of first edition of Williams' *Obstetrics*.

Henry Welch and William T. Councilman. The part of the work which made it a landmark among lesser contemporary texts included an exhaustive consideration of the pathologic and microbiologic details of each entity. However, these scientific delineations did not give the work an air of finality. On the contrary, Williams continually pointed out areas of ignorance, and problems that required solution.[23]

Most reviews of the work were enthusiastic. The *Lancet* stated "the account of the development of the early placenta is the best that has so far appeared in any text-book in the English language", and "the chapter on Puerperal Fever contains an excellent summary of the bacteriology of the disease." It approved Williams' reservations on symphysiotomy, then a procedure much discussed, and welcomed his advocacy of Caesarian section as a substitute for induction of premature labor in cases of contracted pelvis. The critic concluded "Many of the methods of treatment advocated, though not in common practice at the present time, are likely to be the current teaching of the future." However, the reviewer of the *British Medical Journal* was less effusive, observing: "We have hinted that the author is greater as a histologist and a surgeon than as an accoucheur," and "were his knowledge of clinical midwifery equal to his acquaintance with histology and bacteriology, he would have produced an epoch-making work."[24]

As noted by Nicholson J. Eastman, Williams' *Obstetrics* was the first American textbook to present the subject as an academic discipline and to emphasize the vast potential for research. In this respect it undoubtedly was influenced by Osler's monumental textbook of medicine published eleven years previously. Williams' book aroused great interest in research in reproductive biology and did much to help establish the specialty as a medical science. During his lifetime six editions were published in twenty-seven years, and more than 100,000 copies were sold. In 1903, the year of Williams' first edition, Clifton J. Edgar published his *Practice of Obstetrics*, but Williams' text was far superior. In 1913 Joseph B. DeLee published what was to be Williams' only competitor, his *Principles and Practice of*

23. Ibid., p. v; Slemons (n. 14), p. 40.

24. "Review and Notices of Books," *Lancet* 1 (1903): 1675-76; "Reviews," *Brit. Med. J.* 2 (1903): 739.

Obstetrics. Williams issued revised editions of his textbook at intervals of approximately five years. The sixth and last edition appeared in 1930.[25]

The Teaching of Obstetrics in American Medical Schools, and the Unification of Departments of Obstetrics and Gynecology

In speaking of American medical education during the late nineteenth century, William Henry Welch observed, "Probably medical knowledge had nowhere, at any time, fallen to such a low estate..." Henry Pritchett, president of the Carnegie Foundation for the Advancement of Teaching, wrote, "The organization of medical education in this country has hitherto been such as not only to commercialize the process of education itself, but also to obscure in the minds of the public any discrimination between the well-trained physician and the physician who has had no adequate training whatsoever." In his classic indictment of American medical schools,[26] Abraham Flexner emphasized that medical education was not so much a matter of medicine as of education. He had particularly scored obstetrics as making "the very worst showing."

As one of the individuals at the Johns Hopkins School of Medicine who, with Welch, most influenced Abraham Flexner,

25. N.J. Eastman, "The Contributions of John Whitridge Williams to Obstetrics," *Amer. J. Obstet. Gynec.* 90 (1964): 561-65; J. Clifton Edgar, *The Practice of Obstetrics. Designed for the Use of Students and Practitioners of Medicine* (Philadelphia: P. Blakiston's Son, 1903); Joseph B. DeLee, *The Principles and Practice of Obstetrics* (Philadelphia: W.B. Saunders, 1913). Since Williams' death in 1931, the book has continued under the editorship of Henricus J. Stander (seventh through ninth editions), Nicholson J. Eastman (tenth through twelfth editions, the last with Louis A. Hellman), Louis A. Hellman (thirteenth and fourteenth editions, the last with Jack A. Pritchard), and Jack A. Pritchard and Paul C. MacDonald (fifteenth and sixteenth editions). Although highly regarded by most academicians, recent editions have been criticized for stressing technical information rather than considering ethical issues. For instance see M.E. Bowen, "Williams' *Obstetrics* on Abortion," *Man & Medicine* 4 (1979): 205-27.

26. William Henry Welch, "Medical Education in the United States," *Harvey Lectures* 11 (1915-16): 366-82; Henry S. Pritchett, "Introduction," in *Medical Education in the United States and Canada. A Report to the Carnegie Foundation for the Advancement of Teaching*, by Abraham Flexner.... Bulletin No. 4 (New York: Carnegie Foundation, 1910); Abraham Flexner, op. cit., p. 117.

Williams concurred with these observations and recognized their significance. Stimulated by Flexner's report on American medical education, Williams analyzed the quality of teaching in obstetrics by sending a questionnaire to 120 medical schools in the country. He received forty-three replies from the sixty-one schools designated as acceptable by the American Medical Association Council on Medical Education, eleven from the fifty-nine nonacceptable schools, and one from Canada. This survey revealed a series of startling facts. Williams reported that more than one-third of the professors, including four in the "high standard" schools, were not specialists, and many had had no specialty training. One professor confessed that he had never witnessed a delivery prior to assuming his chair, and many others had performed few deliveries. Six medical schools reported having no connection with a lying-in hospital and only nine had adequate clinical facilities. Williams calculated that the average medical student in the country observed only one delivery, and in only eight of the schools could one witness deliveries in satisfactory number.[27]

In most institutions the department of obstetrics was separate from that of gynecology, and many chairmen frankly revealed their deficiencies as surgeons. For instance, several professors acknowledged their inability to perform Caesarian section, and one-half of the respondents confessed that they could not cope with such operative complications as ruptured uterus or ectopic pregnancy. From his analysis, Williams concluded that only one school in the country (not his own) was properly equipped to teach obstetrics along the lines of German Frauenkliniks. Amazingly, one fourth of the professors admitted that their graduates were incompetent to practice obstetrics, the better the school the more frequent such a response.[28]

In addition to his interest in the pedagogic aspects of these findings, Williams was concerned about the consequences with

27. Karl H. Martzloff, "Thomas Stephen Cullen," *Amer. J. Obstet. Gynecol.* 80 (1960): 833-43; John Whitridge Williams, "Medical Education and the Midwife Problem in the United States," *JAMA* 58 (1912): 1-7; also published in *Trans. Amer. Assn. Study Prevention Inf. Mort.* 2 (1912): 165-98.

28. Williams (n. 27), pp. 2-5.

respect to obstetrical care, and maternal and infant morbidity and mortality. He concluded:

> The replies clearly demonstrate that most of the medical schools included in this report are inadequately equipped for their work, and are each year turning loose on the community hundreds of young men whom they have failed to prepare properly for the practice of obstetrics, and whose lack of training is responsible for unnecessary deaths of many women and infants, not to speak of a much larger number, more or less permanently injured by improper treatment, or lack of treatment. Moreover, the spontaneous admission by most of the respondents that poor training of medical men is responsible for many unnecessary deaths in childbirth, forces us to acknowledge that improvement in the status of the midwife alone will not materially aid in solving the problem. *A priori*, the replies seem to indicate that women in labor are as safe in the hands of admittedly ignorant midwives as in those of poorly educated medical men.... The fault lies primarily in poor medical schools, in the low ideals maintained by inadequately trained professors, and in the ignorance of the long-suffering general public.[29]

Williams presented a number of simple recommendations to remedy this disastrous situation, and he must receive credit for many of the improvements in obstetrical teaching which followed the Flexner report. He continued to write on this subject during the subsequent two decades.[30]

Two years later (1914) in his presidential address to the American Gynecological Society, Williams pursued his evaluation of obstetric education and its consequences. He analyzed the 1010 papers presented during the thirty-eight years of the Society. Only about one-third (346) dealt with obstetrical topics. These he rated as poor, or creditable, or excellent. He noted that although members of the society were America's leaders in obstetrics, less than ten percent of the papers contributed anything new to obstetric knowledge. He observed also that in contrast to American contribu-

29. Ibid. (n. 27), p. 6.

30. John Whitridge Williams, "What Can Be Done to Improve the Teaching of Obstetrics in This Country?", *Amer. J. Obstet.* 66 (1912): 456-68; J.W. Williams, "Medical Education and Obstetrics (A Letter)," *JAMA* 58 (1912): 296-97.

tions to gynecology, there were few substantive contributions to obstetrics.[31]

> Judged by these criteria I have placed 42 papers in the former [creditable] and 27 in the latter [excellent] category, 12 and 8 percent, respectively. Consequently it would appear that on the average, less than 2 creditable papers have been contributed each year, and that only 2 contributions could be expected in three years. Surely this is not a showing of which our Society can be proud.[32]

He attributed this to three factors: defective goals in medical education, the estrangement between departments of obstetrics and gynecology, and the tendency to regard obstetric practice primarily for its financial rewards. Williams continued:

> More, however, should be expected from those ... who hold teaching posts ... (they) cannot expect to stimulate their students or train their assistants properly unless they teach them how little is really known and can open vistas of what may be accomplished by patient scientific work ... one of the most important factors in our lack of productivity is to be found in our system of medical education. Until very recently university ideals were entirely lacking in our medical schools.... How many of us, who hold professorships, can truthfully say that we are held to the same accountability as the heads of the 'true' university departments or are expected to justify our existence by an occasional contribution to science? Do not we, and the authorities as well, consider that our obligations have been satisfactorily fulfilled, if we teach a few hours each week, give decent care to the patients under our charge, and once or twice a year write a practical paper so that our professional friends may know that we are still alive? ... medical education is a serious undertaking and is the most costly of all forms of instruction.[33]

31. J.W. Williams, "Has the American Gynecological Society Done Its Part in the Advancement of Obstetrical Knowledge?", *Trans. Amer. Gynec. Soc.* 39 (1914): 3-20; abstracts also published in *JAMA* 62 (1914): 1767-71, and *Amer. J. Obstet.* 70 (1914): 247-250.

32. Ibid., p. 9.

33. Ibid., pp. 17-18.

He then inquired:

> How many obstetrical departments are provided with proper accommodations for a sufficient number of patients for the instruction of students, with adequately paid and enthusiastic assistants, or with suitably equipped laboratories for research work? ... Real university departments are just beginning to be organized in some other branches of medicine, but I know of none in gynecology or obstetrics ... in most of our schools obstetrics is the least well-cared-for department, and must ordinarily be content with what is not wanted by others, while the professor is frequently regarded by his colleagues as being engaged in an almost unworthy pursuit.[34]

Williams concluded by pointing out the need for combined departments of obstetrics and gynecology. He closed, prophetically:

> The professorial chairs in the university medical schools need to be filled by broadly trained scientific men who are prepared to give their time to their duties. Such a development, however, is scarcely to be expected until the universities are prepared to equip and maintain woman's clinics, somewhat similar to the Frauenkliniks of Germany, but more liberally provided with laboratories for the anatomical, chemical, pathological, and physiological investigation of gynecological and obstetrical problems. In this event the director must be an accomplished scientific man in addition to being a competent clinician, who will devote the major portion of his time to the management of his department.... Institutions of this character will also require the services of a large staff of well-trained and enthusiastic assistants.... Large endowment or state aid will be necessary for the support of such institutions, but I can conceive of no better expenditure of funds if it leads to fuller knowledge of the many unsolved problems connected with women and to the development of a body of men competent to undertake their investigation. I hope to see a number of such institutions scattered over the land, and then no future president of this or any other society will be able to say that its members have not done their part in the advancement of obstetrical or gynecological knowledge. We have heard ... of 'the passing of a specialty', but I feel that there is a glorious future for the broader gynecology, which is as yet scarcely in its infancy. Let us do what we can to advance it.[35]

34. Ibid., p. 18.

35. Ibid., pp. 19-20.

Although Williams pursued his campaign to unify the departments of obstetrics and gynecology — and it led to departmental mergers in many schools — the Johns Hopkins Medical School rejected his plan.

From 1911 onward, in addition to his duties as the professor of obstetrics and the hospital's obstetrician-in-chief, Williams served as dean of the Johns Hopkins Medical School. One of the most crucial decisions during his tenure was the development, against much local opposition, of the full-time system for the clinical faculty. The merits of the full-time plan and the disadvantages which it might entail had been canvassed thoroughly in conversations with Franklin Paine Mall, one of the most creative educators on the faculty. Mall often accompanied Williams on his morning walk to the medical school, and apparently contributed many of the ideas on education put into practice by Welch and Williams. Although in his letters Welch referred to the plan as Williams', unquestionably it was the product of both men.[36]

Williams and Welch found the concept of the full-time system attractive pedagogically and beneficial, but they recognized that many members of the faculty would not view it in this way. The obvious purpose of this change was to relieve teachers of the exacting obligations of private practice in order to conserve their time for academic pursuits and to provide the necessary assistance, hospital facilities and laboratory equipment for both effective routine teaching and for intensive research.

Vigorous opponents of the new system were not lacking. Howard A. Kelly found full-time professorship untenable because it would compel him to forsake his large referral practice. After he was accused of reluctance to join the full-time group because of "making considerable sums of money," Kelly calculated that in the previous fourteen years he had received $42,000 for services at the hospital,

36. J. Robinson, *Tom Cullen of Baltimore* (London: Oxford University Press, 1949) 228; F.R. Sabin, *Franklin Paine Mall, the Story of a Mind* (Baltimore: The Johns Hopkins Press, 1934) 254-62; D. Fleming, *William H. Welch and the Rise of Modern Medicine* (Boston: Little, Brown & Co., 1954) 175-80; A. Flexner, *I Remember; the Autobiography of Abraham Flexner* (New York: Simon & Schuster, 1940) 178, 184.

but he had contributed $92,000 towards its expansion and development.[37]

As early as April 1911, William Osler in Oxford learned of the proposed reform. He wrote that "to cut off the heads of departments from a practice" was utopian. Like Kelly, Osler resented the implication that the clinical professors had become wealthy. He declared "I did not take away from B[altimore] a dollar made in practice!" Further, he deplored the effort to shrink the clinicians to the confines of a laboratory. "What would the school have been if the clinical men had not been active in the local and national medical societies? Would whole-time men have the same influence on the profession at large — I doubt it." After studying Flexner's report, which he criticized as "full of errors & misconceptions", Osler sent an open letter to Ira Remsen, president of the university, and distributed copies to the trustees of the hospital and medical school professors. He wrote, "I fear lest the broad open spirit which has characterized the school should narrow, as teacher and student chased each other down the fascinating road of research, forgetful of those wider interests to which a great hospital must minister."[38]

Although the trustees had approved the plan in the late spring of 1911, two years elapsed before a final decision was reached. During this time Osler continued to object, noting in 1912 that full-time would lead to a faculty of Halsteds, "a very good thing for science, but a very bad thing for the profession".[39]

Eventually the faculty and trustees adopted the completed plan. After due consideration, in 1913 the General Education Board, a Rockefeller benefaction, appropriated 1.5 million dollars (the "Welch Endowment for Clinical Education and Research") to pay some of the clinical teachers in three departments — medicine, surgery, and pediatrics — on a full-time basis. Obstetrics was part of

37. A.W. Davis, *Dr. Kelly of Hopkins, Surgeon, Scientist, Christian* (Baltimore: The Johns Hopkins Press, 1959) 100.

38. Harvey Cushing, *The Life of Sir William Osler* (Oxford: The Clarendon Press, 1925) 2:270-71, 292-93; Sir William Osler, Letter to President Remsen of Johns Hopkins University, 1 Sept. 1911 (Oxford: 1911) 11.

39. Ibid., 2:335.

the original plan, but was dropped and was not included until six years later.[40]

After learning of this decision, Osler warned of the dangers of "a life of clinical and laboratory seclusion." Elsewhere he stated that the full-time system would produce "a set of clinical prigs, the boundary of whose horizon would be the laboratory, and whose only human interest would be research".[41]

Unfortunately, many held Dean Williams responsible for the transient difficulties consequent to the adoption of this plan. His popularity suffered, and he paid the price of a pioneer who opposes entrenched institutional policies. In a rare moment of expressing his feelings, he once confided to a colleague, "You won't believe it, but there are times when I could put my head upon someone's shoulder and cry like a woman." He never did. Personal criticism he endured stoically without protest. However, eventually most educators endorsed the full-time principle and gave Williams a large share of the credit for its introduction into clinical medicine. In 1919, after six additional years had elapsed, the Department of Obstetrics was also placed on a university basis. Although he now headed the first full-time obstetrical department in the country, Williams had the residual disappointment that he had failed to unify the departments of gynecology and obstetrics.[42]

In 1917 Howard A. Kelly had commenced an indefinite leave of absence, apparently in an effort to avoid overt controversy. With the inauguration of the full-time system in 1919, Kelly retired to private practice. Williams strove to have the departments merged, but he met with resistance. When the issue was raised at the advisory board of the university, Welch is reported to have asked Williams, "Well, who will do the surgery?" To this Williams replied, "I'll do it myself". Welch responded, "Williams, everybody knows you can't operate," and the meeting broke up. Thomas Cullen was appointed chief of gynecology, which became a quasi-independent section of the Department of Surgery. A short time before this encounter Williams had been asked to head the combined

40. Slemmons (n. 14), p. 62.

41. Cushing (n. 38), 2:383, 387; see also Osler (n. 38), p. 7.

42. Slemmons (n. 14), pp. 64-73.

departments at Columbia University, and he threatened that he would do so if he were not given the combined chair, but apparently he could not bear to leave Baltimore.[43]

Training of Academicians

An additional contribution of Williams to academic medicine, and one of the most important, was the group of residents he trained who became leaders in other institutions. Some of the most notable were: Robert Gordon Douglas, Cornell University; Nicholson J. Eastman, Johns Hopkins University; Francis C. Goldsborough, University of Buffalo; Allan Frank Guttmacher, Mount Sinai Hospital, New York; Clarence B. Ingraham, University of Colorado; Frank W. Lynch, University of California; Andrew A. Marchetti, Georgetown University; John L. McKelvey, University of Minnesota; Arthur H. Morse, Yale University; Daniel G. Morton, University of California, San Francisco and University of California, Los Angeles; Everett D. Plass, University of Iowa; J. Morris Slemons, Yale University; Henricus J. Stander, Cornell University; Herbert Thoms, Yale University; Herbert F. Traut, University of California, San Francisco; Tiffany J. Williams, University of Virginia; and Karl M. Wilson, University of Rochester. One of Williams' precepts for the men he trained was to "write at least one paper a year, and do the job thoroughly."[44]

Contributions to Scientific Obstetrics

During the colonial period and until the beginning of the present century, obstetrics in America, as in England and the continent, was to a great extent in the hands of midwives. "Man-midwives" generally were held in disdain and contempt by fellow physicians. Although this attitude changed slowly, by the end of the nineteenth century midwives still delivered about 80% of the women in the United States. Few physicians took serious interest in the subject. Even those who considered themselves obstetricians-gynecologists tended to emphasize gynecological surgery and pathology.

43. Martzloff (n. 27); Te Linde (n. 20).

44. Eastman (n. 25), pp. 564-65; and Slemmons (n. 14), p. 43 give a partial list.

Gynecological and Obstetrical Pathology

As already noted, Williams originally planned to concentrate on gynecologic pathology. While working in the laboratory of William Henry Welch he wrote on papillary cystoma of the ovary (1891), tuberculosis of the female generative organs (1892), sarcoma of the uterus (1894), and choriocarcinoma (deciduoma malignum) (1895). After his sabbatical year, 1894-95, his interest gradually shifted to obstetrical pathology. He wrote on puerperal infection (1893), contracted pelvis (1899), placental infarcts (1900), caesarean section, and symphysiotomy (1901), induction of premature labor (1906), abruptio placentae (1915), syphilis in pregnancy (1916), postpartum hemorrhage (1919), circumvallate placenta (1926), the Naegele pelvis (1929), and regeneration of the placental site (1931).[45] In all he published more than 130 papers. Many were classic studies, several of which were monographs one hundred pages or more in length.

45. John Whitridge Williams, "Contributions to the Histogenesis of the Papillary Cystomata of the Ovary," *Bull. Johns Hopkins Hosp.* 2 (1891): 149-57; J.W. Williams, "Papillomatous Tumors of the Ovary," *Johns Hopkins Hosp. Reports* 3 (1892): 1-84; J.W. Williams, "Tuberculosis of the Female Generative Organs," *Johns Hopkins Hosp. Reports* 3 (1892): 85-152, also published in *Trans. Amer. Gynec. Soc.* 17 (1892): 409-80; J.W. Williams, "Beitrage zur Histologie und Histogenese des Uterus-Sarcoms," *Ztschr. f. Heilk.* 15 (1894): 141-84; J.W. Williams, "Contributions to the Histology and Histogenesis of Sarcoma of the Uterus," *Amer. J. Obstet.* 29 (1894): 721-64; J.W. Williams, "Deciduoma Malignum," *Johns Hopkins Hosp. Reports* 4 (1895): 461-504, also published in *Trans. Amer. Gynec. Soc.* 20 (1895): 348-93; J.W. Williams, "Puerperal Infection Considered from a Bacteriological Point of View with Special Reference to the Questions of Auto-Infection," *Amer. J. Med. Sci.* ns. 106 (1893): 45-58; J.W. Williams, "The Bacteria of the Vagina and Their Practical Significance, Based upon the Bacteriological Examination of the Vaginal Secretion of Ninety-Two Pregnant Women," *Amer. J. Obstet.* 38 (1898): 449-83, also published in *Trans. Amer. Gynec. Soc.* 23 (1898): 141-89; J.W. Williams, "The Frequency of Contracted Pelves in the First Thousand Women Delivered in the Obstetrical Department of the Johns Hopkins Hospital," *Obstetrics* 1 (1899): 241-62 and 333-40; J.W. Williams, "The Frequency and Significance of Infarcts of the Placenta, Based upon the Microscopic Examination of Five-Hundred Consecutive Placentae," *Amer. J. Obstet.* 41 (1900): 775-801, also published in *Johns Hopkins Hosp. Reports* 9 (1900): 431-60; J.W. Williams, "Pelvic Indications for the Performance of Caesarean Section," *Trans. Amer. Gynec. Soc.* 26 (1901): 260-76, also published in *Amer. Med.* 2 (1901): 483-88; J.W. Williams, "The Induction of Premature Labor and Accouchement Forcé in the First Five Thousand Labors in the Obstetrical Department of the Johns

Prenatal Care

One of Williams' more notable contributions was his role in the introduction, advocacy, and popularization of prenatal care, considered by many to be not only the most important advance in obstetrics during the first half of the twentieth century, but also the most significant contribution to the specialty by an American.

With his interest in pathology and bacteriology, Williams was concerned particularly with the primary causes of maternal mortality — infection, hemorrhage, and toxemia of pregnancy. Against this background, during the second decade of this century he joined pediatricians, public health workers, and various women's groups who worked in what became known as the infant welfare movement. In 1909 many of these persons combined their efforts and established the American Association for Study and Prevention of Infant Mortality. As one of its founders, and during the years 1914 to 1915

Hopkins Hospital," *Surg. Gynec. Obstet.* 3 (1906): 402-9, also published in *Trans. Amer. Gynec. Soc.* 31 (1906): 316-33; J.W. Williams, "Is Pubiotomy a Justifiable Operation? An Affirmative Answer Based upon a Personal Experience in Thirteen Cases," *Amer. J. Obstet.* 58 (1908): 202-31, also published in *Trans. Amer. Gynec. Soc.* 33 (1908): 336-89; J.W. Williams, "Is Pubiotomy a Justifiable Operation? Second Communication Based upon a Series of Twenty-Five Successful Cases," *Amer. J. Obstet.* 61 (1910): 721-52, also published in *Trans. Amer. Gynec. Soc.* 35 (1910): 282-330; J.W. Williams, "Premature Separation of the Normally Implanted Placenta," *Surg. Gynec. Obstet.* 21 (1915): 541-54; J.W. Williams, "The Frequency of Syphilis in Obstetric Practice," *Amer. J. Obstet.* 74 (1916): 83-84; J.W. Williams, "The Tolerance of Freshly Delivered Women to Excessive Loss of Blood," in *Contributions to Medical and Biological Research. Dedicated to Sir William Osler, Bart., M.D., F.R.S. In Honour of His Seventieth Birthday, July 12, 1919, by His Pupils and Co-Workers* (New York: Paul B. Hoeber, 1919), 2:1238-54; J.W. Williams, "Placenta Circumvallata," *Trans. Amer. Gynec. Soc.* 51 (1926): 260-75, also published in *Amer. J. Obstet. Gynecol.* 13 (1927): 1-16; J.W. Williams, "A Clinical and Anatomic Description of a Naegele Pelvis," *Amer. J. Obstet. Gynec.* 18 (1929): 504-14, also published in *Trans. Amer. Gynec. Soc.* 54 (1929): 258-68; J.W. Williams, "Regeneration of the Uterine Mucosa after Delivery, with Especial Reference to the Placental Site," *Amer. J. Obstet. Gynec.* 22 (1931): 664-96 and 793-96, also published in *Trans. Amer. Gynec. Soc.* 56 (1931): 53-89; J.W. Williams, "Disappearance of the Placental Site during the Puerperium," *JAMA* 97 (1931): 523-29.

its president, Williams insisted that the reduction of infant mortality should begin before the baby is born rather than after.[46]

During the previous century, although physicians gave sporadic attention to pregnant women, there was no systemic study of the pregnant woman or the fetus. Beginning with the turn of this century, John William Ballantyne of Edinburgh, who had great interest in the pathology of the fetus, developed the conception of what he called a "pro-maternity" (later pre-maternity) ward or hospital. With the help of a benefaction he was able to set aside one bed in which women suffering from complications of pregnancy could be treated for extended periods. Ballantyne hoped that "antenatal therapeutics" would reduce to a minimum the chance that the fetus would develop an abnormality or would be affected by maternal disease.[47]

In 1901, under the direction of the Instructive District Nursing Association, nurses in Boston began to visit pregnant women registered in the outpatient department of the Lying-In Hospital. In 1909 Mrs. William Lowell Putnam, who helped organize the Infant Social Service Department of Boston's Women's Municipal League, suggested systematic examination of pregnant mothers. By 1911 the Boston Lying-In Hospital had developed the first clinic for formal prenatal care. Women made regular visits for measurement of their blood pressure, analysis of urine, and instruction concerning diet, hygiene, and exercise. Mrs. Putnam became impatient with the profession's lack of enthusiasm over the program she had started

46. John Whitridge Williams, "What the Obstetrician Can Do to Prevent Infantile Mortality," *Trans. Amer. Assn. Study Prevention Inf. Mort.* 1 (1910): 190-201; J.W. Williams, "The Limitations and Possibilities of Prenatal Care. Based on the Study of 705 Fetal Deaths Occurring in 10,000 Consecutive Admissions to the Obstetrical Department of the Johns Hopkins Hospital," *JAMA* 64 (1915): 95-101; also published in *Trans. Amer. Assn. Study Prevention Inf. Mort.* 5 (1915): 32-48.

47. John William Ballantyne, "A Plea for a Pro-Maternity Hospital," *Brit. Med. J.* 1 (1901): 813-14; J.W. Ballantyne, "A Lecture on Maternities and Pre-Maternities," *Brit. Med. J.* 1 (1902): 65-66.

in Boston and solicited the support of Williams. He quickly became one of the most influential champions of systematic prenatal care.[48]

Williams promptly grasped the importance of prenatal care and its potential for lowering both maternal and neonatal mortality. At that time there were about 650 maternal deaths per 100,000 births, and about 40 neonatal deaths per 1,000 live births and 40 stillbirths per 1,000 total births.[49]

In the first edition of his textbook Williams proposed that about six weeks before expected confinement the patient should see her physician for general hygienic instruction and physical examination, including measurement of the pelvic dimensions. He also endorsed the Prochownick diet, which limited women's carbohydrate consumption in an effort to diminish the size of the fetus and thus make delivery easier.[50]

Williams also required that the patient submit a sample of urine for measurement of albumin and sugar and for microscopic examination at monthly intervals during the first seven months of the pregnancy and twice a month or once a week thereafter. This regimen remained essentially unchanged in the second (1907), third (1912), and fourth (1917) editions of Williams' text.[51]

48. James Lincoln Huntington, "Relation of the Hospital to the Hygiene of Pregnancy," *Boston Med. Surg.* 169 (1913): 763-65; Mrs. William Lowell Putnam, "Discussion," *Trans. Amer. Assn. Study Prevention Inf. Mort.* 2 (1912): 220; Herbert Thoms, *Our Obstetric Heritage. The Story of Safe Childbirth* (Hamden, Conn., 1960) 145.

49. U.S. Department of Labor, Children's Bureau, *Birth Registration. An Aid in Protecting the Lives and Rights of Children*, Bulletin #2, Monograph no. 1 (Washington: U.S. Dept. of Labor, 1914); Robert Morse Woodbury, *Infant Mortality and Its Causes. With an Appendix on the Trend of Maternal Mortality Rates in the United States* (Baltimore: Williams & Wilkins, 1926); U.S. Department of Labor, Children's Bureau, *Maternal Mortality in Fifteen States*, Bureau publication no. 223 (Washington: U.S. Department of Labor, 1934).

50. Williams (n. 22), pp. 175-79.

51. J.W. Williams, *Obstetrics: A Textbook for the Use of Students and Practitioners*. Second edition (New York: D. Appleton, 1907); J.W. Williams, *Obstetrics: A Textbook for the Use of Students and Practitioners*. Third edition (New York: D. Appleton, 1912); J.W. Williams, *Obstetrics: A Textbook for the Use of Students and Practitioners*. Fourth edition (New York: D. Appleton, 1917).

In 1915, as chairman of the Committee of Prenatal Care Records of the American Association for Study and Prevention of Infant Mortality, Williams presented a model record form which detailed many particulars of the patient's history and physical examination, including blood presssure, pelvic measurements, fetal heart sounds, and Wassermann reaction. In addition, it requested details from the visiting nurse on the domestic environment and subsequent antenatal examinations, the course of labor, the puerperium, and the history of the child during its first year of life.[52]

About the same time Williams reported that in 705 fetal deaths among 10,000 consecutive admissions to the obstetrical department of the Johns Hopkins Hospital, syphilis was the single most important cause, accounting for 186, or 26%. Despite this incidence he taught:

> A Wassermann test ... is out of the question on account of its expense and the best that we can do is to bear the possibility of syphilis constantly in mind, and to teach those engaged in practical work to be always on the lookout for it.[53]

He also reported that dystocia was a factor in 17.4% of infant deaths and he emphasized the need for pelvic examination before term to detect abnormalities. Finally, he reported that toxemia occurred in 6.5% of cases and premature birth in 7%, noting that with proper prenatal care the mortality from these causes could have been reduced by 80%.[54]

In this study Williams asserted that his analysis of the causes of fetal death should awaken his colleagues to the "immense scope" of prenatal care. For this was

52. J.W. Williams, Elizabeth Putnam and Cressy L. Wilbur, "Prenatal Care Records," *Trans. Amer. Assn. Study Prevention Infant Mort.*, 6 (1916): 357-63.

53. Williams (n. 46, 1915), p. 98.

54. Ibid., pp. 96-99.

> not merely a matter of a few visits by a nurse to the patient in her own home, but should consist in the coordination of the medical, nursing and social service resources of the hospital in the effort to obtain such treatment and supervision for the mother as will offer the greatest possible guarantee for the safe delivery of a normal child, which can be kept healthy by maternal nursing.[55]

Williams then embarked on a study of the next four thousand patients delivered at the Johns Hopkins Hospital; the Wassermann test was performed on every woman at her first visit. In addition, a serologic test was done on the fetal blood at time of delivery and the placenta was examined histologically. As a result of this study Williams recommended that on the first visit a Wassermann test should be performed, and if the results were positive, a regimen of intensive treatment should begin immediately. He included this recommendation in the fifth edition of his textbook (1923).[56]

Also in the fifth edition he recommended for the first time that the patients be seen in a clinic at monthly intervals during the first seven months of pregnancy, and every two weeks thereafter. In the same edition he first recommended regular measurements of blood pressure as prophylaxis against toxemia of pregnancy.[57]

Although Williams had advised the recording of patients' weight on his prenatal form of 1915, he did not require that the patients be weighed regularly. Such a recommendation did not appear in "Williams" until the sixth edition of 1930, the last that he wrote himself.[58]

55. Ibid., p. 101.

56. J.W. Williams, "The Value of the Wassermann Reaction in Obstetrics, Based upon the Study of 4547 Consecutive Cases," *Bull. Johns Hopkins Hosp.* 31 (1920): 335-42, also published in *Trans. Amer. Gynec. Soc.* 45 (1920): 84-109; J.W. Williams, *Obstetrics: A Textbook for the Use of Students and Practitioners.* Fifth edition (New York: D. Appleton, 1923).

57. Williams (n. 56, 1923), p. 228.

58. J.W. Williams, *Obstetrics: A Textbook for the Use of Students and Practitioners.* Sixth edition (New York: D. Appleton-Century, 1930).

University Women's Clinics

During several trips to Germany and Austria, Williams observed and worked in Frauenkliniks attached to major university hospitals. In addition to providing excellent clinical care, these were centers for teaching and research. Williams proposed that American schools form "university women's clinics" for these purposes. He held that the American clinics should have an even greater commitment to research than those of Europe. He advocated also that the departments of obstetrics and gynecology be unified and that the clinic include an outpatient dispensary in addition to the inpatient department. At the dispensary patients would receive pre- and postnatal instructions and would be examined periodically by a nurse or student physician.[59]

Williams envisioned these institutions as conducting both clinical and basic laboratory research. He encouraged experimentation in animals for investigating anatomical, physiological, chemical, and pathological problems, such as the causes of fetal abnormalities and the toxemias of pregnancy, and he advocated that lessons learned from the laboratory be applied to the management of pregnant women.[60]

Contributions to the History of Obstetrics

Like most of the other leaders in the early Johns Hopkins Medical School, Williams was interested in the history of medicine. In commenting on Williams' scientific reports Kelly observed:

59. Eastman (n. 25), pp. 561-62; J.W. Williams, "The Place of the Maternity Hospital in the Ideal Plan," *Trans. Amer. Assn. Study Prevention Infant Mort.* 4 (1914): 355-59; J.W. Williams, "The Functions of a Woman's Clinic," *Science* 64 (1926): 581-86; J.W. Williams, "What Is a University Woman's Clinic?", *JAMA* 96 (1931): 2142-44.

60. J.W. Williams, "Obstetrics and Animal Experimentation. Defense of Research," in *Defense of Research Pamphlet* 18 (Chicago: Amer. Med. Assn., Council on Def. of Med. Research, 1911): 29-32, abstract also published in *JAMA* 56 (1911): 1159-67; Williams (n. 59, 1926), p. 585.

> After the fashion of an earlier generation, he always furnishes a masterly historical resume in a manner calculated to captivate at once the reader's interest; with this retrospective *mis-en-scène*, he goes on to report his own work which is perfect in character and presentation.[61]

Almost every chapter of his obstetrical textbook included such a synopsis of the topic under discussion. The same year that his textbook appeared, he contributed an extensive history of obstetrics in the United States up to 1860 to Siebold-Dohrn's *Geschichte der Geburtshilfe der Neuzeit.* This fifty-five page survey traces early obstetrical literature, reviews the development of obstetrical anesthesia and ideas on puerperal fever, and analyzes the contributions of the early obstetrical writers in America.[62]

Alan Guttmacher recalled that in class

> he particularly stressed the blank spots in our knowledge, and was ruthless in exposing thinly proved hypotheses ... he had the Oslerian historical approach setting forth each new advance against a rich historical background.[63]

Like Osler, Kelly, Welch, and others of the group, Williams collected old medical works with the appreciation of a bibliophile. Ultimately he bequeathed these volumes to the Welch Library.[64]

Personal Qualities

Most of our knowledge of Williams' human qualities derives from Alan Guttmacher, and another of his students, J. Morris Slemons. Williams was what today we call a very private person: his personal life was a closed book to almost everyone.[65]

61. Kelly (n. 1), p. 172.

62. J.W. Williams, "Die Geburtshilfe in Amerika," section in Siebold-Dohrn's *Geschichte der Geburtshilfe* (Tubingen, 1903) 3:193-267; J.W. Williams, "A Sketch of the History of Obstetrics in the United States Up to 1860," *Amer. Gynec.* 3 (1903): 266-94.

63. Guttmacher (n. 5), p. 24.

64. Ibid., p. 25; Stander (n. 6), p. 4.

65. Guttmacher (n. 5), pp. 25-26.

Undoubtedly a factor which contributed to his productivity was his strict daily routine. Every morning but Sunday he walked to the hospital, about a mile and a quarter, in twenty minutes. He would arrive promptly at 9 o'clock and just before entering the lecture room, would knock his pipe against his walking stick or umbrella handle to empty it of its ashes. He was so punctual that his students could set their watches by this noise. At 9:04 he would greet the residents with his usual morning salutation, "Well, who did you kill last night?" Then he would drink a full glass of ice water and stand before his class at 9:05. He lectured until 10 o'clock, next visiting ward patients with complications and his private patients until 10:30. From then until 1:30 he worked in his laboratory, examining surgical and autopsy specimens and teaching the residents or students who worked with him.[66]

After a brief lunch he would spend the afternoon seeing private patients, writing, and answering correspondence. On Tuesday and Friday afternoons he saw clinic patients then returned to the laboratory until 5:30, when he would bid the staff a hearty goodbye with, "See you tomorrow, God willing."[67]

After walking back home, or occasionally taking the streetcar, he dined promptly at 7 p.m. After dinner he studied medicine from 8 to 10 p.m. in his library, and after that he would read French novels or French history for an hour. At 11 o'clock he joined his family and perhaps a few friends in the dining room for a Scotch and soda or whisky and water, with cheese and crackers. At midnight he would retire. His schedule rarely varied, and he had no amusement but his work.[68]

Because of the affluence into which he was born, Williams lacked insight into the financial condition of his associates. Guttmacher recalled:

> He had ... arranged for me to go to the Boston Lying In Hospital as an Assistant Resident. I was delighted but told him I was afraid I would have to decline since I had no means of getting to Boston. He looked

66. Ibid., p. 20.

67. Ibid.

68. Ibid., pp. 20-21.

> surprised and said in a most typical fashion, "Why I thought you were rich." He immediately arranged for my transportation and gave me a little additional pocket money.[69]

Williams' secure financial status was reflected in his attitude toward obstetrical fees, which were ridiculously low. Guttmacher stated that any man of similar reputation in any other city would have charged fully ten times as much. He thought that "a doctor should make a living out of medicine, but that he should never make such a business of it that through it he became wealthy."[70]

Guttmacher also recounted an episode which, as much as any other exemplifies his attitude toward fees.

> Just a few days before his death I was asked to appear as a medico-legal witness in an abortion case. I went to the Professor's laboratory to ask his advice — we always felt free to ask his advice about everything. The chief was peering intently through his microscope, but sensed that I was standing behind him. Without looking up, he said, "Well!" "Doctor Williams, I have a chance to make a hundred dollars". "How?" he asked. I told him. He wheeled around on his revolving stool, looked at me, sniffed audibly, "It smells bad. Whenever I appear as a medico-legal witness I am careful to accept no fee, then I am sure I am testifying for the side I think is right."[71]

Williams apparently had a keen, but restrained sense of humor. On one occasion a dignified parson brought his new wife, "an elderly primapara," for consultation. The parson, knowing that first labors are usually protracted and difficult in women approaching forty, was deeply concerned. After examining the patient, Williams assured the couple that the course of labor would be normal. Shortly thereafter, the woman returned alone.

> "Dr. Williams, I have something to tell you." The Professor replied, "There is something I can tell you. Some years ago you were indiscreet and had a child." "Yes, that's it," she said, "but what shall I

69. Ibid., p. 27.

70. Ibid.

71. Ibid., pp. 27-28.

> tell the Reverend?" Dr. Williams thought for a moment and then replied, "Parsons are hard people, I wouldn't say a word about it or he'll kick you out."[72]

At term the woman went into labor and the parson had an exaggerated case of nervousness, being fearful that his wife would experience a terrible ordeal. On the contrary, after a two-hour labor she delivered a large boy. Williams went to the sitting room and broke the good news to the divine. The parson was jubilant.

> Wasn't that marvellous, Dr. Williams, and the whole thing took only two hours; two hours, mind you, in a woman of forty with a first baby. Dr. Williams, that is another incontestable proof of the efficacy of prayer for I have been praying for nine months that my wife should be delivered speedily.[73]

Another anecdote concerns a well-born young couple who presented a few weeks after marriage; the woman was three months pregnant. The couple was terrified at the expected disgrace but Williams reassured them. The woman went into labor when she was seven months married and nine months pregnant. Williams notified the obstetrical nurse that he expected a premature baby and requested them to warm the crib and prepare a layette for such an infant. The young woman delivered a large girl.

> Dr. Williams winked — he had a very informative wink — and the nurses cut and tore the premature jacket so that they could squeeze a nine-pound baby into it. Then he went out and told the assembled grandmothers that their granddaughter was a delicate seven months' baby and her chances for survival were poor. He asked their co-operation and requested them not even to look at the baby, for such puny premature infants are especially susceptible to respiratory infections, and he feared that the grandmothers might breathe some germs on it. The family acquiesced, and the baby was whisked into the nursery in a covered basket. After two weeks, Dr. Williams informed the family that the child had established a world's record, it had grown from four pounds to ten — truly a marvellous thing — and he asked their permission to report the case at a medical meeting.[74]

72. Ibid., p. 23.

73. Ibid.

74. Ibid., pp. 23-24.

Conclusions

Probably more than any other individual, John Whitridge Williams established obstetrics as an academic discipline. A physician throughly familiar with European academic standards, he evolved a philosophy of education in obstetrics which has served as a model to the present day. One of the less acclaimed faculty members of the early Johns Hopkins Medical School, he built single-handedly a department which served as a training ground for several generations of leaders in American academic obstetrics and gynecology. His monumental textbook has been published continously since its first printing in 1903.

Williams had a background of professionalism and strong religious training. Well grounded in pathology and dedicated to medical education, he established a department from which residents went to chairmanships in many of the better medical schools in America. He combined serious interest in the history of medicine with insight into future problems. A man of warmth and kindness, he took great interest in his subordinates and colleagues, yet he was retiring, bashful, and ill at ease with many people. Devoid of small talk, he could be brusque on occasion.

Together with other leaders in the early days of the Johns Hopkins School of Medicine, Williams helped create a milieu in which medical education was supreme and in which the care of patients was combined with historical scholarship and scientific research — a model and memorable academic community.

In many ways his life was a crusade: a crusade against ignorance and prejudice and for the development of obstetrics as a legitimate academic discipline, a crusade to unite departments of gynecology and obstetrics (one in which he had great success in the country as a whole, despite his failure in his own institution), a crusade for a full-time system in academic medicine, a crusade for scholarship in medicine, a crusade for prenatal care of pregnant women and against a cavalier attitude towards women and children, and a crusade for lowering the death rates of infants and mothers. As Howard A. Kelly observed, "Williams is the greatest man in obstetrics on this side of the Atlantic or the other." Guttmacher concluded, "Perhaps his contributions to medicine will not be immortal, but the incomparable training he gave to us in the art of obstetrics and in 'the way of life', will pass on through countless generations."[75]

75. Davis (n. 37), p. 91; Guttmacher (n. 5), p. 30.

The years since Williams' death have witnessed a dizzying proliferation of activities associated with departments of obstetrics and gynecology. Too often the result has been the reduction of educational and research functions until these activities have become incidental to the over-all work of the department. As departments of gynecology and obstetrics have responded to the pressures of society, the difficulties have increased. To the basic medical issues service, community and postgraduate educational functions have been added. Departments have expanded to include subspecialists able to teach reproductive biology, gynecologic endocrinology, gynecologic oncology, perinatology, sexuality, ethics, and other subjects. But while this fragmentation has presented problems in instruction, research, and practice and has strained departmental resources, it also has been a source of strength. For in broadening its horizons and deepening its perspectives, obstetrics and gynecology has matured. Not only has it improved its scientific base, but it has become more socially responsible. Slowly the speciality has reached John Whitridge Williams' goal — a subject taught by broadly trained persons who combine thorough understanding of scientific principles with clinical practice. The specialty has evolved from a quasi-mechanical approach to pregnancy and diseases of women to reproductive medicine in the broadest sense.

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Percussion Discovered

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THE basic approach of illness to a modern physician is diagnostic. For him percussion, like auscultation and palpation, belongs to the most unsophisticated methods of our age. When the 18th century physician Leopold Auenbrugger discovered percussion for medical purposes, conditions were quite different. An accurate diagnosis was of practically no importance as Galenic humoralism still was the guiding philosophy in treatment as well as prognosis. The morbid signs and symptoms of a sick person alone were deserving of treatment, except for certain surgical procedures; bleeding and purging were suitable for most conditions. Etiologic diagnosis and, much later, specific therapy were to change medicine.

Saul Jarcho points out (*Bull. Hist. Med.* 33 [1959]: 470-474) that for many years Auenbrugger's "Inventum Novum" of 1761 did not induce his contemporaries to use percussion for localizing pathologic changes in the thorax. A review, probably written by Oliver Goldsmith in a daily newspaper of London, far from Auenbrugger's native Vienna, seems to have been the first positive reaction to the immortal discovery, but it was not before Corvisart, Napoleon's physician, revived it in 1808 that percussion received worldwide attention.

How Auenbrugger was led to make use of an acoustical observation is a matter of interesting speculation. Max Neuburger suggested that he as the son of an innkeeper probably was familiar with determining the level of wine in a cask by striking the outside with the fingers. Saul Jarcho "cannot help thinking that Auenbrugger's musical skill and lifelong interest in music may have contributed to his discovery" (*J. Intl. Coll. Surgeons* 31 [1959]: 722). W.A.Mozart wrote to his father on December 10, 1783 that he had bought the score of Salieri's opera "Der Rauchfangkehrer" (The Chimney-Sweep) with a libretto by Dr. Auenbrugger written in German and not in the customary Italian. Mozart himself had used a German libretto for his "Abduction from the Seraglio" in 1781 and again did so for his "Magic Flute" in 1791. Father Leopold Mozart, in a letter to his wife on August 12, 1773, also mentioned Dr. Auenbrugger, whose elder daughter impressed him with her extraordinary keyboard playing and musicality.

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The Henry Phipps Institute: Recollections of a Foreign Research Fellow

EVA S. LEAKE

IN 1952, assisted by a fellowship from the United States Department of State, I paid my first visit to the United States, my purpose being to study and do research in the laboratory of Dr. Florence B. Seibert at the Henry Phipps Institute. I had been associated with the pathology department of a tuberculosis sanatorium in Mexico City and had become interested in the biochemistry of tuberculosis. A colleague who had spent several months at the Phipps Institute provided the necessary recommendations to secure me a welcome in Dr. Seibert's laboratory.

The Institute was located at the corner of 7th and Lombard Streets in the black section of Philadelphia. The inconspicuous five-story brick building could be identified only by a small plaque at the side of the front entrance. When I arrived in January, 1952, the Institute, which had started operation on February 2, 1903, functioned as a research institution, a clinic and a school of public health nursing. The first floor was devoted to clinical work, x-ray examination, and instruction in public health. Here the physicians checked their patients and prepared many clinical research papers. The staff included Drs. C. Hatfield, F. Craig, H.W. Hetherington, H. McPhedran, H. Landis, S. Stein, H. Israel, R. Lukens, J. Cutler, and R. Teague. Although I met most of the nurses, I became acquainted only with those who were more directly involved in skin testing or who joined us for lunch in the library. They were Miss F. Eshelman, Miss M. Smith, Miss E. Dufour, Mrs. Rudolph Yeager, and Miss D. Greiner.

The second floor housed Dr. Seibert's laboratories, the media room, sterilizing facilities, and Dr. Esmond R. Long's administrative offices. The third floor was occupied in its entirety by Dr. Max B. Lurie. The fourth floor was shared by Dr. Joseph D. Aronson and Dr. Lurie's rabbit colonies, as well as by a small animal room for less privileged experimental animals. On the fifth floor was the library, which served also as lunchroom, and a terrace.

The year 1952 marked the 50th anniversary of the Institute. To

commemorate this occasion Dr. Frank A. Craig, Associate Director, prepared a booklet, "Early Days at Phipps"[1] in which he gave a brief historical account of the Institute and its founders.

Thanks to the establishment of the Division of Medical Research of the National Tuberculosis Association, the Institute gained worldwide recognition, not only as an establishment devoted to the treatment and prevention of tuberculosis, but also as one devoted to basic research on that disease.

The first head of the laboratories at the Phipps was Dr. Mazyck P. Ravenel. In 1924, Dr. Eugene L. Opie became Director of the Institute and brought the pillars that were to support research for many years to come. Dr. Joseph D. Aronson, who had joined the Institute in 1920, later became interested in the epidemiology of tuberculosis with particular interest on BCG vaccination. In 1926, Dr. Opie brought Dr. Max B. Lurie to do research in experimental pathology, and in 1932, Dr. Esmond R. Long and Dr. Florence B. Seibert joined the group, covering the biochemistry and nutrition of the tubercle bacillus. A few years after joining the staff at Phipps, Dr. Long became Director of the Laboratory and later Director of the Institute. He held this position until June, 1955, when he retired. Dr. Julius L. Wilson succeeded him.

At the time of Dr. Long's retirement, it was rumored that the trustees of the University of Pennsylvania, which had assumed charge of the Institute in 1910, wanted to move the Institute closer to the university grounds and that they were contemplating a drastic change in the operation of the Institute, especially because Dr. Aronson had died, Dr. Long had retired, and Drs. Lurie and Seibert were reaching the age of retirement. In 1958, the Institute closed its doors. Soon afterward the building was sold and demolished to give way to modern housing. Louis Pasteur, in his Jubilee Address to the French Academy of Science, uttered a famous sentence: "Men will die, but the institutions they have created will live forever." In the case of the Henry Phipps Institute, the funds were distributed in 1958, partly for research to the Department of Public Health and Preventive Medicine in the newly built Richards Building on the University of Pennsylvania campus, and partly for public health work in a wing of the health center newly built near the university at 43rd Street and Chester Avenue. On September 13, 1960 the opening of the new building was marked by a scientific program. Dr. Theodore H. Ingalls was then the director. He recounted the

history of the Institute in the *Harvard Medical Alumni Bulletin* in 1962.[2]

Who were the scientific investigators at the Henry Phipps Institute?

Dr. Esmond R. Long was born in Chicago in 1890 and received his Ph.D. and M.D. degrees from the University of Chicago. While he was a second-year medical student, an attack of tuberculosis forced him to interrupt his studies. For six years he sampled the varieties of tuberculosis therapy then in vogue, including a sojourn at the Trudeau Sanatorium, where he became even more interested in the pathology of the disease and in the bacillus. After a period of work with Anton Ghon in Prague he returned to the University of Chicago, where he focused all his attention on research on tuberculosis. In 1921 he became interested in the growth and nutrition of the tubercle bacillus. He devised a synthetic culture medium (Long's medium) which furthered research on components of the tubercle bacillus since it was a medium of standard composition free from contaminating protein. His book, *The Chemistry of Tuberculosis*,[3] written in collaboration with Dr. H. Gideon Wells and Dr. Lydia M. DeWitt, and later revised by Dr. Long, remains a classic source of information on the mycobacteria. For many years Dr. Long was Editor-in-Chief of the *American Review of Tuberculosis*. He served the National Tuberculosis Association as its president (1937-38) and as the director of its medical research committee (1947-55). He was Editor of the *International Journal of Leprosy* and in World War II served with the rank of colonel. He wrote many books, among them, *A History of American Pathology*[4] and *Selected Readings in Pathology*.[5] In 1970, he was awarded the Gold Headed Cane of the American Association of Pathology and Bacteriology. He died in Philadelphia on November 11, 1979.

Dr. Joseph D. Aronson, born in Lithuania in 1889, was brought to this country in infancy. He received his M.D. degree at the old Medico-Chirurgical College of Philadelphia in 1908. He joined the Phipps Institute in 1920. First as a captain and later as a colonel in the Army Medical Corps, Dr. Aronson served in both world wars. In the early 1930s his interest in tuberculosis and BCG led to extensive field studies on the prevalence of tuberculosis in rural districts of the South and in areas of lower prevalence in rural Michigan. He worked with Dr. Opie on tubercle bacilli in human lesions. In 1935, he started his study of BCG vaccination of American Indians living in Arizona, Wyoming, the Dakotas, and Alaska. He continued his

epidemiologic studies until his death, which occurred on October 17, 1958 during a field trip in Surinam.

Dr. Max B. Lurie was born in Lithuania in 1893 to parents of distinguished Jewish ancestry. In 1907 he emigrated to the United States with his family and received the M.D. degree at Cornell University in 1921. He contracted tuberculosis while a medical student. Soon after graduation, he entered a hospital for consumptives in Denver, Colorado. In 1926, he became a Fellow in Pathology under Dr. Opie at the Phipps Institute, and in 1955 he became a full professor. The late 1920s represented a period of general and deep interest in pathologic and immunologic differences between first infections and reinfection tuberculosis, and Dr. Lurie was a pioneer in the development of laboratory methods for study of the problem. He set up experimental models for air-borne infection in guinea pigs, with ingenious arrangements of cages, which not only demonstrated the mechanisms and frequency of air-borne contagion, but even led to determination of the particulate size of infecting units. In 1932 he acquired a colony of highly inbred rabbits from stock raised for experiments at the University of Chicago. By means of litter matings he soon separated out two strains of animals with sharply differing degrees of resistance to tuberculosis. Over a period of thirty years, he obtained seventeen strains of rabbits known to have different degrees of resistance or susceptibility to tuberculosis, representing a rabbit population of 7,000. In ensuing years he studied the role of macrophages in the destruction of tubercle bacilli, extracellular factors in resistance, the role of age and sex, and many other elements affecting intrinsic resistance. His research was also significant in demonstrating the effect of cortisone in reducing protective inflammation and of thyroid hormones in enhancing it. His comprehensive book *Resistance to Tuberculosis*[6] is highly influential. He died in Philadelphia on September 23, 1966.

Dr. Florence B. Seibert was born in Easton, Pennsylvania, in 1897. She acquired poliomyelitis at a very early age and remained handicapped. She obtained the Ph.D. degree in biochemistry at Yale University in 1923 and in the same year, she went to the University of Chicago as a postdoctoral fellow to continue the work that had served for her thesis — the study of pyrogens. At that time it was held that proteins when injected in animals produced fever, but Dr. Seibert found that the fever-producing substances were in the distilled water used to dissolve the injected materials. The

culprits proved to be bacteria that had fallen into the water kept in the laboratory. These bacteria give off pyrogens which are not destroyed by boiling or autoclaving and which may even be found in sterile solutions. The only way to guarantee pyrogen-free water is to distill it properly and then, if it is not used immediately, to sterilize it before bacteria can drop in again. One wonders how many present-day scientists, ignorant of this fact, describe reactions which are really due to contaminating bacterial pyrogens carried in their injected materials. Dr. Seibert's findings have made possible the intravenous injection of materials without risk of fever. For this outstanding work, Dr. Seibert received the John Elliot Memorial Award from the American Association of Blood Banks.

In 1924 Dr. Seibert received a grant from the National Tuberculosis Association and became Dr. Long's assistant. She applied herself to the culture and nutrition of the tubercle bacillus. From this time she worked for 35 uninterrupted years on the biochemistry of tuberculosis. In 1928 she crystallized the tuberculoprotein and in 1941 her Purified Protein Derivative (PPD) was adopted by the United States Government as the standard for purified tuberculins. It became the international standard in 1952. This is known as PPD-S (the S standing for "standard" and not for "Seibert"). Detailed accounts of her activities are given in her autobiography.[7]

Sharp & Dohme, the pharmaceutical manufacturers, offered her their facilities for the preparation of the standard PPD. To make enough standardized protein all the material had to be precipitated from a single batch; 600-700 bottles were used at a time in six periods from June to December of 1939, the total being 4,000 bottles. The materials were filtered and stored in the frozen state and then pooled. The protein was precipitated by neutral ammonium sulfate; the final product was distributed among 3200 vials, representing a total yield of 107 grams of PPD-S. This amount contains about 5 billion low skin-test doses or 20 million high skin-test doses. In 1958, after all this work and after issuing more than 125 publications, Dr. Seibert retired to St. Petersburg, Florida. Unable to tolerate idleness, she became a volunteer consultant for the United States Public Health Service and for the research department of Bay Pines Veterans Administration Hospital, where she conducted studies on the bacterial etiology of cancer.

In referring to Dr. Seibert, one should not ignore her sister, Mabel, to whom she dedicated her autobiography. In the foreword

to Dr. Seibert's book, Dr. Long wrote:

> Quietly and steadily over the years Mabel has helped her sister, in the home, in the laboratory, and in travel — which has been wide — in short whenever a physical assist was necessary. Together they have made a remarkable team.[8]

Since there were no restaurants near the Institute, most of the staff members congregated in the library on the fifth floor and prepared sandwiches at a table loaded with food by a staff member. The lunch hour provided the opportunity for vigorous discussions between Dr. Seibert, Dr. Lurie, other staff members, and visitors. The discussions related not only to science and research, but also to politics. The staff frequently sat silently listening to Dr. Lurie as he discussed the persecution of the Jews, a subject close to his heart. In her autobiography, Dr. Seibert speculated that Dr. Lurie's father, a rabbi, had wanted his son to follow in his course, "but this plan he (Lurie) had circumvented in order to become an authority on the importance of native resistance in tuberculosis. So these discussions, which frequently assumed the aspects of lectures ... were substitutes for the sermons which he had originally been destined to give."[9]

Dr. Long made several visits to Colombia, South America. He spoke fairly good Spanish; when he was at the institute between his multiple travels, he and I conversed in that language. This gave him the opportunity to practice Spanish and gave me the opportunity to understand every word that was said, since I was having great difficulties with English at that time. It was said that everyone knew when Dr. Long was speaking Spanish because of the gestures he was making.

Soon after my arrival the differences in personalities among the investigators became obvious. For example, one noted Dr. Long's kindly and pleasant attitude, Dr. Aronson's remoteness and austerity, Dr. Lurie's haste, and Dr. Seibert's care and precision, even though she was slowed by her handicap.

By the time of my association with Dr. Seibert, the major portion of the work on the purification of tuberculoproteins and the studies by free-boundary electrophoresis had almost been terminated, but I had the opportunity to see the electrophoresis apparatus in operation. Dr. Seibert had spent time with Dr. The Svedberg and Dr. Arne Tiselius in Uppsala, Sweden, where she had used the ultracentrifuge

and the free-boundary electrophoresis apparatus in the studies of tuberculoproteins. When she returned to the Phipps Institute, she was granted enough money to purchase a similar electrophoresis apparatus, which was made in the Uppsala laboratory shop. She assembled the instrument and it was housed in the basement of the Institute where the necessary twenty feet of space was available. This was the first instrument of its kind in the United States.

At that time the Institute must have been considered a Mecca for all the foreign tuberculosis experts who came to this country. It offered a unique situation of having under one roof up-to-date clinical information as well as research experience in the field of tuberculosis. Dr. Seibert recalled one year when fourteen such visitors from many different countries were there at the same time.

Many good memories remain with me of the three years that I spent at the Henry Phipps Institute. The most outstanding are of my association with Dr. Esmond R. Long and with Dr. Florence B. Seibert, who has been an inspiration to me.

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The Fasciae of the Genito-Urinary Organs: Historical, Anatomical, and Clinical Aspects

JOHN A. BENJAMIN and CHARLES E. TOBIN

"See that your lamps are burning; replenish them with oil..."
— Laurentius Laurenti, 1700

TIME and effort have aided man in the gaining and in the dispensing of knowledge, and it has been a common goal of man to do these with worthwhileness. Zambeccari, according to Angelo Fabroni, gave us words of wisdom to direct our good intentions and efforts[1]:

a. To bring discoveries to the scientists.

b. To make a clear and comprehensive study of the "marvelous human body."

c. To send forth students with all knowledge.

d. To motivate man to find something new.

Our present concern is with the history and the anatomy of the fasciae of the genito-urinary tract (Figure 1), and to consider their clinical aspects.

There appeared to be no established definition of, or priority for, the terms Camper's and Scarpa's fasciae. The original papers of

1. Giuseppe Zambeccari was born on March 19, 1655, at Castlefranco di Sotto near Florence. He studied at the University of Pisa, whose traditions were especially enriched by Galileo, Malpighi, Vesalius, Borelli, Bellini, and others. Zambeccari took his doctor's degree in 1679 and went to Florence to study with Francesco Redi. In 1704 he succeeded Bellini as Professor of Anatomy, and he held this influential post with distinction until his death December 13, 1728. See Saul Jarcho, "Giuseppe Zambeccari; A Seventeenth-Century Pioneer in Experimental Physiology and Surgery," *Bull. Hist. Med.* 9 (1941): 144-176.

Pieter Camper[2] (1768 and 1801) dealt primarily with the anatomy and surgery of the hernia. A study of his available works on many phases of his medical research, as well as the *Oeuvres*[3] and the commemorative papers published on the 150th anniversary of his death[4] yielded no mention of his name in association with a superficial fatty layer of subcutaneous tissue. The Dutch eulogists probably would have given him credit for naming this fascia, even if he had not done so himself. Camper's portrait, made by the Dutch engraver Reiner Vinkeles (1741-1816), appeared in the frontispiece of the posthumous work edited by Pieter Camper's son, Adrien Gilles Camper.[5]

Scarpa's original paper[6] also dealt primarily with the anatomy and surgery of the hernia. Neither Camper nor Scarpa described these layers as they are currently defined in the literature. A fascial layer over the lower ventral abdominal wall is associated with the name of Scarpa: "L'aponevrosi dell' oblique *esterno* muscolo per certo tratto sopra dell' arcata femorale e dell' anello inguinale è ricoperta da uno strato sottile della tela aponevrotica del muscolo fascialata, del quale strato una parte si stende di qua dall' anello sul muscolo cremastere,

2. P. Camper, *Demonstrationum anatomico-pathologicarum* (Amsterdam: Schreuder and Mortier, 1760-1762). See also *Mém. Acad. Roy. Chir. Par.* 4 (1768): 164-322. P. Camper, *Icones herniarum*, ed. Samuel Thomas Soemmerring (Frankfurt: Varrentrapp and Wenner, 1801). C.E. Tobin and J.A. Benjamin, "Anatomic and clinical re-evaluation of Camper's, Scarpa's and Colles' Fasciae," *Surg. Gynec. & Obst.* 88 (1949): 545-559.

3. Pieter Camper, *Oeuvres* (Paris: Jensen, 1803) 1: 17-103.

4. *Nederland. Tijds. Geneesk* 33 (1939): 2085-2157.

5. Petrus Camper, *Discours prononçé par feû M. Pierre Camper, en l'Académie de Dessein d'Amsterdam, sur le moyen de représenter d'une manière sûre les diverses passions qui se manifestent sur le visage; sur l'étonnante conformité qui existe entre les quadrupèdes, les oiseaux, les poissons et l'homme; et enfin sur le beau physique: publiée par son fils Adrien Gilles Camper; traduits du hollandois par Denis Bernard Quatremere d'Isjonval* (Utrecht: B. Wild et J. Altheer, 1792).

6. A. Scarpa, *Sull' ernie. Memoire anatomico-chirurgiche* (Milano: dalla Reale stamperia, 1809); see also C.E. Tobin and J.A. Benjamin, "Anatomical study and clinical consideration of the fasciae limiting urinary extravasation from the penile urethra," *Surg. Gynec. & Obst.* 79 (1944): 195-204.

che accompagna nello scroto, ove si confonde e si perde nel tessuto cellulare, che unisce l'esterna superficie del cremastere col *dartos*; l'altra parte se spiega verso il fianco" (The aponeurosis of the external oblique muscle, for a certain space above the femoral arch and inguinal ring, is covered by a fine layer of the aponeurotic sheath of the muscle covering. One part of this layer is extended from here to the ring over the cremasteric muscle which it extends into the scrotum, where it is fused and loses itself in the cellular aponeurotic web which unites the external surface of the cremaster with the dartos; the other part lifts itself against the flank). Scarpa's work, published in Milan in 1809, consisted of five memoirs with ten engravings in an atlas folio. The passage given is from his *Sull' ernia inguinale e scrotale, Memoria prima,* page 2.

The term fascia of Scarpa was clarified as follows by Sir John Struthers,[7] "Although the description of this fascia by Scarpa, as contained in the translation of his work on hernia, is very brief and imperfect, I shall retain the title fascia of Scarpa, as it is preferable to have a short specific name for a part to which frequent reference is to be made."

Further, Struthers (1854) was the earliest source found to use the term Scarpa's fascia and then only for brevity of description rather than for authoritative definition. Struthers added, "...the fascia of Scarpa has another important connection, in its continuation around the spermatic cord, towards the perineum, where it becomes continuous with the true superficial fascia of that region ... and to avoid this source of confusion and derive advantage from the use of a short specific name, I am in the habit of calling it the *fascia of Colles* ... and if anatomists would agree to call these two fasciae the fascia of Scarpa, and the fascia of Colles, it would save much perplexity to the student."

In regard to the role of Colles' fascia in urinary extravasation we again quote Struthers, "...by introducing a blow-pipe, or bellows, through an opening in the fascia of Colles, in front of the anus, ... the air will readily force its way forwards and inflate the scrotum, but does not reach backwards or side ways."

7. J. Struthers, *Anatomical and Physiological Observations* (Edinburgh: Sutherland and Knox, 1854), Part I, esp. Chap. XVI, "On the fascia of Scarpa," pp. 231-239.

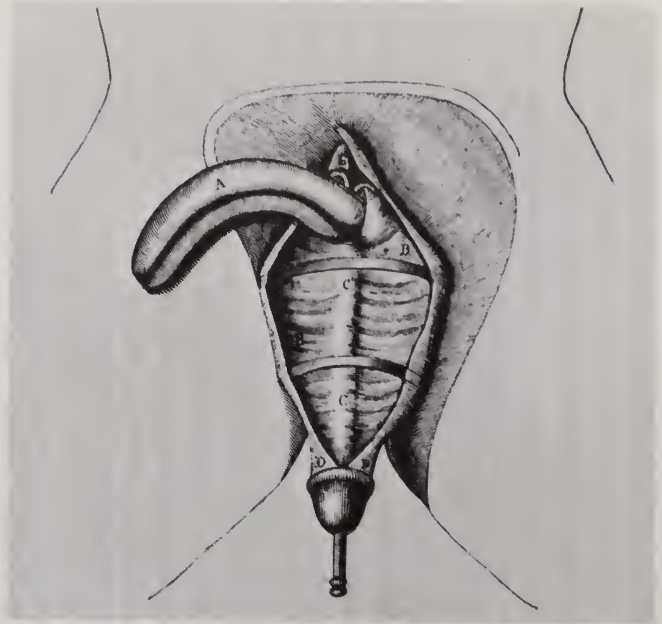
Furthermore, in order to understand fully the fasciae of the genito-urinary organs we must consider a dense fascial layer in the perineum described in 1811 by Colles.[8]

> Now proceed to dissect the Perinaeum. Raise the skin of the Perinaeum, extending the dissection beyond the tubera ischii to the thighs. This exposes to view a strong fascia, which, on dissection, will be found to cover the entire of the perinaeum, and to blend itself with the structure of the scrotum. This fascia, although on a superficial view it appears continuous with the fascia of the muscles of the thigh, will yet be found, on closer examination, to attach itself very firmly to the rami of the ischium and pubis. The texture and connections of this fascia, will serve to explain many of those phaenomena, attendant on the effusion of urine into the perinaeum, by rupture or ulceration of the posterior part of the canal of the urethra.
>
> First, Then, you will find that this fluid, when so effused, although it forms a tumor in perinaeo, rarely terminates by suppuration and ulceration in this spot; being here resisted by the dense and unyielding texture of the fascia, diffusion laterally towards the thighs, is prevented by the close attachment of this fascia to the rami of the pubis and ischium; while its progress forwards, is favoured by a quantity of cellular substance, interposed between the surface of the perinaeal muscles and this fascia ... Before you raise this superficial fascia of the Perinaeum, it may be of use to make a transverse incision through it, midway between the tuberosities of the ischium and the arch of the pubis. This incision will enable you to see the muscles of the perinaeum, lying in their natural situations ... Proceeding in the dissection, now remove the superficial fascia of the perinaeum, and then clear away some cellular substance covering the muscles, so as to give a distinct view of them. Next remove these muscles, taking care not to cut another fascia which lies under them, and which we shall presently examine, under the name of the anterior layer of the triangular ligament of the urethra, or membranous septum of the perinaeum.

Our investigations of these fasciae revealed some interesting findings. Microscopic and macroscopic sections from these regions showed that the subcutaneous tissue is made up of only one layer — strands or sheets of collagenous and elastic fibers surrounding deposits of fat which are similar in structure to examples of this

8. A. Colles, *A treatise on surgical anatomy* (Dublin: Gilbert and Hodges, 1811) 174-177.

Figure 1. Drawing of the sagittal section of the adult human male pelvis to show some of the fasciae of the genito-urinary organs.



Reproduction of plate from Buck's original paper showing the relations of "Buck's fascia" to the corpora. *A*, Dissection of the sheath of the penis, showing the corpus cavernosum, enucleated from the sheath; *B*, the sheath, split up through the suspensory ligament, of which it is a continuation; *C*, the relations of the sheath to the corpus spongiosum urethrae, one layer of which passes above, the other below it; *D*, its relations to the glans penis, to which the sheath adheres inseparably by its outer surface, while by its inner surface it caps the corpus cavernosum; *E*, the dorsal arteries, veins and nerves, raised with the sheath.

Figure 2. Reproduction of plate from Buck's original paper.

tissue in other parts of the body. Further, sections taken from, and dissections made of, real and simulated cases of extravasation from the penile urethra demonstrated that the extravasates are within the one common layer and are not limited by a deep membranous (Scarpa's-Colles') layer. The attachment of the collagenous and elastic fibers to the deep fascia or periosteum of the body wall as well as the change in direction of these fibers, and the compactness or looseness of the one subcutaneous layer account for the direction and limitation of the spread of extravasates.

The fasciae lining the abdomen, pelvis, and spermatic cord form continuous layers.[9] These fasciae are dissectable into three main strata: (a) an inner stratum for the gastrointestinal system; (b) an intermediate stratum embedding the urogenital system, adrenals, larger vessels, and nerves; and (c) an outer stratum, the transversalis fascia, which is the thickened fascia of the musculo-aponeurotic body framework of the bony wall. The intermediate stratum may be in the form of two laminae in the region of the kidneys and ureters and adjacent to the ventral abdominal wall.

Cooper's[10] original definition of the term transversalis fascia must now be reviewed and the erroneous definition of this term, given in some of the current texts, must be discussed. The transversalis fascia is not limited to the inner surface of the transversus abdominis muscle but it continues with the intrinsic fascia of the other components of the abdominal and pelvic wall.

The internal spermatic fascia appeared not to be a distant fascial layer similar to the external spermatic or cremasteric layers in individuals without indirect inguinal hernia. Our own restudy indicated that it is the areolar and fatty tissue, embedding the components of the spermatic cord, which are continuous with the retroperitoneal tissue of the abdomen and pelvis.

Clinically these strata are of importance: (a) as surgical guides in the abdomen, pelvis and spermatic cord; (b) as a barrier to, or

9. C.E. Tobin, J.A. Benjamin, and J.C. Wells, "Continuity of the fasciae lining the abdomen, pelvis, and spermatic cord," *Surg. Gynec. & Obst.* 83 (1946): 575-596.

10. Sir A.P. Cooper, *The anatomy and surgical treatment of inguinal and congenital hernia* (London: T. Cox, 1804) 8.

pathway for, the spread of infection, of extravasated blood or urine, or of gases injected during insufflation studies of the renal-adrenal region. In addition, the retroperitoneal tissue imbedding the ureters may be involved in the production of ureteric obstruction.

The major leaf of Colles' fascia was found to extend uninterruptedly from the dorsal margin of the urogenital diaphragm forward across the top of the scrotal cavity, forming a fascial partition of considerable thickness between the superficial urogenital pouch and the cavity of the scrotum.

Experimental studies showed that in the majority of cases, permeability of Colles' fascia for urine is so low that very little urine could pass through it even after relatively long periods of time. Apparently it is this property of Colles' fascia which accounts for the delayed passage of urine from the superficial urogenital pouch into the scrotum.

The objection may be raised that our experiments were performed on dead material, the physical properties of which may be quite different from those which Colles' fascia may show in life. Up to the present time no opportunity has offered itself to investigate this point. It is, however, well known that, in general, living tissues are less permeable than dead tissues. Should this rule apply to the case in question, it would strengthen rather than weaken the force of the argument.

It appeared that the major leaf of Colles' fascia which extends between the superficial urogenital pouch and the cavity of the scrotum is relatively impermeable to urine. In the majority of cases the fasciae reacted to the test in such a manner that they could be considered to act as a barrier in preventing extravasated urine from immediately appearing in the scrotum. In general the permeability of the fascia decreased after exposure to urine. In no case was the permeability increased by the action of the urine as pointed out by Smith.[11]

Our dissections showed clearly the relations of Colles' and Buck's fasciae. In 1848, Buck published "A New Feature in the Anatomical Structure of the Genitourinary Organs Not Hitherto Described." In

11. R.D. Smith, "The permeability of Colles' fascia for urine," *J. Urol.* 62 (1949): 535-541.

his work he described a fascia, which commonly bears his name[12] (Figure 2). He attached particular emphasis to the relation between this fascia and urinary extravasation. His judgment was correct, for this fascial layer is the first to be involved when urine leaves the urethral channel under pathological circumstances.

Buck stated:

> The anatomical structure in question consists of a distinct membranous sheath investing the penis in the manner to be described, [forming one continuous membrane enclosing the corpus cavernosum in its cavity and embracing the corpus spongiosum urethrae between two layers] and forming a continuation of the suspensory ligament above, and the perineal fascia below ... The texture and connections of this fascia [Buck's] will serve to explain many of those phenomena attendant on the effusion of urine into the perineum by rupture or ulceration of the posterior part of the canal of the urethra.

In our studies of simulated extravasation from rupture of the penile urethra, the fluid passed first through the corpus spongiosum (where it entered the vascular, erectile tissue) and the tunica albuginea of the corpus spongiosum. After perforating Buck's fascia it spread between Buck's and Colles' fasciae in the perineum; between Buck's fascia and the dartos around the penis; between the dartos and external spermatic fasciae in the scrotum; and between Scarpa's fascia and the deep fascia over the aponeurosis of the external oblique muscle of the abdomen.

Buck's fascia is a strong fibrous layer between the dartos fascia and tunica albuginea, and is extended from the inferior surface of the urogenital diaphragm and inferior rami of the pubis and ischium around the shaft of the penis to the corona of the glans penis. It is external to the deep vessels and nerves of the penis and is continuous with the suspensory ligament. Each of the three erectile bodies of the penis with its respective muscles in the perineum is enclosed in a separate compartment of Buck's fascia. As the corpora cavernosa penis and corpus spongiosum urethrae approximate each other to form the shaft of the penis, all three erectile bodies and their muscles are encircled by a common layer of this fascia. A transverse septum

12. Gurdon Buck, Jr., "A new feature in the anatomica; structure of the genito-urinary organs not hitherto described," *Trans. A.M.A.* 1 (1848): 367-372.

of Buck's fascia separates the corpora cavernosa penis from the corpus spongiosum urethrae, enclosing the corpus spongiosum in a separate compartment along the ventral surface of the shaft of the penis. The bulbocavernosus and ischiocavernosus muscles are inserted into the inner surface of Buck's fascia. This fascia may be compared to a prolonged tendon or aponeurosis of these muscles.

This study, which added to previous knowledge of the anatomy of the fasciae related to urinary extravasation, not only provides a basis upon which to explain the route and the structures involved, but also helps to clarify the current theories dealing with the mechanism of extravasation. On the free portion of the shaft of the penis, both of these fasciae can be identified and kept apart with relative ease.

Colles' fascia (penile dartos) can be traced without any interruptions dorsally into the perineum; then it forms a partition (major leaf of Colles' fascia) between the cavities of the superficial urogenital pouch and the scrotum and also gives rise to the scrotal dartos. A leaf which forms the partition was found to exhibit in no uncertain manner the chief characteristics described by Colles: it is firmly attached to the limbs of the pubic arch and lies superficial to the penile muscles.

Similarly Buck's fascia, which on the shaft of the penis can be recognized by its intercavernous septum, by its aponeurotic nature, and by its intimate adherence to the tunica albuginea, can be dissected without any interruption both on the urethra and on the crura into the perineum. Invariably, as the dissection follows this fascia, it is carried into a level deep to the penile muscles (Table I).[9]

Uhlenhuth et al.[13] stated that at times Buck's fascia may become fused in the perineum with Colles' fascia. In our experience a fusion of these two fasciae did not occur and represented the fusion of the penile dartos with the deep or subfascial layer of Colles' fascia. The real Buck's fascia is, however, visible in Figures 11 and 12 of Tobin and Benjamin[6] and is exposed only to a very slight extent, namely in

13. E. Uhlenhuth, R.D. Smith, E.C. Day, and E.B. Middleton, "An investigation of Colles' and Buck's fasciae in the male," *J. Urol.* 62 (1949): 542-563 (esp. p. 561); E. Uhlenhuth, "Fasciae and subperitoneal fascial spaces of the male pelvic cavity," *Bull. of School of Med., U. of Maryland* 36 (1951): 60-85; E. Uhlenhuth, D.T. Hunter, and W.E. Loechel, *Problems in the anatomy of the pelvis: an atlas* (Philadelphia: Lippincott, 1953).

Table I

STRUCTURES AND CONTINUITY OF FASCIAL LAYERS[9]

Abdominal wall	Penis	Scrotum	Urogenital triangle
Camper's fascia Subcutaneous superficial fatty layer		The cremasteric fascia, cremasteric muscle and tunica vaginalis communis are the only coverings of the spermatic cord listed in the Basle Anatomical Nomenclature (see V.E Emmel: The BNA arranged as an outline of regional and systematic anatomy. Philadelphia , Wistar Institute Press, 1927).	Superficial, fatty layer: between skin and Colles' fascia
	Dartos facia Membranous. Contains involuntary muscle fibers. Located between skin and Buck's fascia	*Dartos facia* Membranous. Contains involuntary muscle fibers. Located between skin and external spermatic fascia	
Scarpa's fascia Deeper membranous layer — attached to iliac fascia below inguinal ligament			*Colles' fascia* Membranous. Attached to inferior rami or ischium and pubis and to dorsal inferior border of urogenital diaphragm
Buck's fascia Continuous with deep fascia of external oblique aponeurosis as suspensory ligaments of penis. May contain terminal fibers of bulbocavernous and ischiocavernosus muscles	*Buck's fascia* Aponeurotic. Surrounds corpora cavernosa penis and corpus spogiosum urethrae in separate compartments. External to muscles of these erectile bodies: internal to dartos fascia		*Buck's fascia* Aponeurotic. Forms three separate compartments around muscles and erectile tissue of penis. Attached superiorly to inferior layer of urogenital diaphragm and to inferior rami of pubis and ischium

the space between the right bulbocavernosus muscle and the cut margins of Colles' fascia.

Anatomically and clinically, Denonvilliers' fascia (Figure 3)[14] is not only an important landmark in the surgical approach to the prostate and seminal vesicles (Figure 4) but it is also considered an effective barrier in limiting the spread of pus, extravasated urine, and malignant tumors of the prostate, seminal vesicles, and rectum.

> Behind the prostate, between the seminal vesicles and the rectum, there is a distinct membranous layer, which I call prostatoperitoneal. This is its position: from the two sides it fuses with the compact cellular tissue which surrounds the venous plexus at the base of the bladder; on the anterior side it loses itself in the most distant side of the prostate; on the posterior side it adheres to that part of the peritoneum which descends between the bladder and the rectum. This adherence, very marked, as close as if it were fused with the tissue, explains the constancy of the rectovesicle cul-de-sac of the peritoneum; the half-moon form of this cul-de-sac which lies at the posterior border of the aponeurosis that always describes a curve with convexity in front, or which represents (is in the form of) a "V" jutting in anteriorly at an angle. The inferior surface which touches the rectum barely adheres to it by a very loose cellular tissue; from the upper surface, however, some thick cellular projections arise which surround the seminal vesicles. The texture of this membranous layer resembles that of the dartos; it appears to be formed principally by fibers which separate while radiating from the posterior part, and those occupying the median line are the most prominent; in vigorous subjects some evident muscular fibers exist, but only on the sides. Whatever is the additional arrangement of this membranous layer, it is very resistant, and forms a completely closed space at the base of the bladder, in which the seminal vesicles and a part of the ureters and vasa deferentia are enclosed; these enter into the cavity by means of very thick cellular tissue which forms their lateral sides.

The following study was undertaken in an attempt to clarify the embryological origin and anatomical structure of Denonvilliers' fascia and to ascertain which parts of this fascia are encountered in the perineal approach to the prostate. The structure known as

14. C.P.D. Denonvilliers, "Anatomie de Périnée," *Bull. et mém. Soc. Anat.*, Paris 11 (1836): 105-106; idem, *Propositions et observations d'anatomie de physiologie et de Pathologie* (Paris: Thèse de l'Ecole de Médicine [No. 285], 1837) 23. The quotation below is from the latter work.

— 23 —

En arrière de la prostate, entre les vésicules séminales et le rectum, existe une couche membraneuse bien distincte, que j'appelle *prostato-péritonéale.* Voici quelle est sa disposition : Des deux côtés elle se confond avec le tissu cellulaire serré qui entoure les plexus veineux du bas-fond de la vessie; par son bord antérieur, elle se perd sur l'extrémité la plus reculée de la prostate; par son bord postérieur elle adhère à cette portion du péritoine qui descend entre la vessie et le rectum. Cette adhérence, des plus marqués, aussi intime que s'il y avait confusion de tissu, explique la constance du cul-de-sac recto-vésical du péritoine; la forme en demi-lune de ce cul-de-sac se lie à la disposition du bord postérieur de l'aponévrose, lequel décrit toujours une courbe à convexité antérieure, ou qui représente un V à angle saillant en avant. La face inférieure qui touche au rectum lui adhère à peine par un tissu cellulaire très-lâche; de la face supérieure s'élèvent, au contraire, des prolongements celluleux assez denses qui enveloppent les vésicules séminales. La texture de cette couche membraneuse se rapproche de celle du dartos; elle paraît principalement formée par des fibrilles qui partent en rayonnant de la partie postérieure, et dont celles qui occupent la ligne médiane sont les plus prononcées; chez les sujets vigoureux des fibres musculaires manifestes existent, mais seulement sur les côtés. Quelle que soit au reste l'organisation de ce plan membraneux, il est très-résistant, et forme avec le bas-fond de la vessie une espèce de loge exactement close de toutes parts, dans laquelle se trouvent renfermées les vésicules séminales et une partie des uretères et du canal déférent; ceux-ci s'introduisent dans cette cavité au milieu du tissu cellulaire très-dense qui en forme les parois latérales.

Photograph of page 23 from Denonvilliers' *Thesis*, 1837, "Propositions et Observations d'Anatomie, de Physiologie et de Pathologie" giving his description of the tissue known as Denonvilliers' fascia.

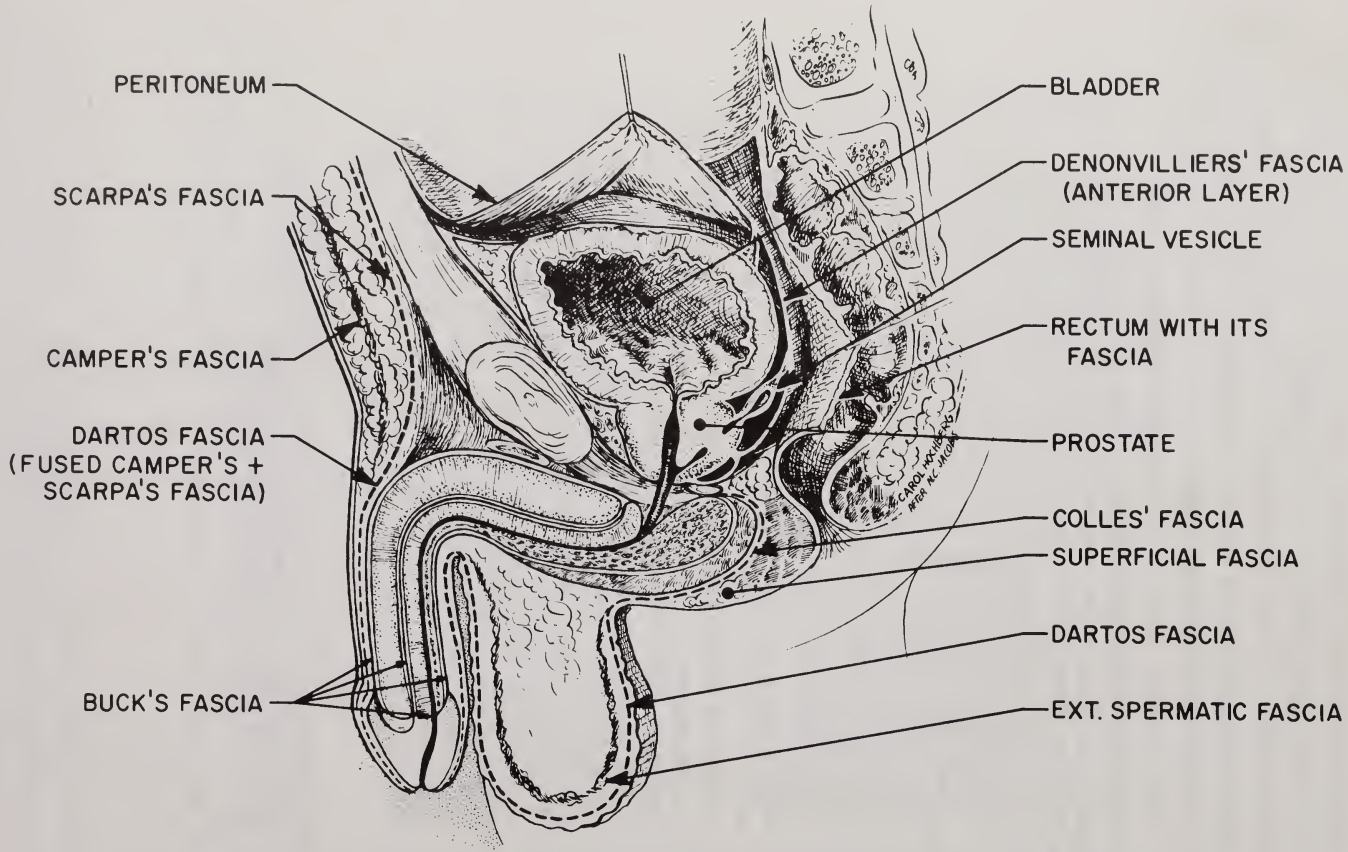


Figure 4. Anatomic approach for the Young procedure for perineal prostatectomy. Charles E. Tobin and John A. Benjamin, "Anatomical and surgical restudy of Denonvilliers' fascia," *Surg. Gynec. & Obst.* 80: 383 (1945). Reproduced with permission; half-tone drawing by Natt C. Jacobs of the University of Rochester, School of Medicine and Dentistry, Department of Anatomy.

Denonvilliers' fascia was observed to be derived embryologically from two sources: (1) a layer surrounding the developing prostate and seminal vesicles and another layer around the rectum; and (2) connective tissue (mesenchyme) adjacent to the mesothelium of the pelvic cul-de-sac of peritoneum extending to the level of the developing levatores ani muscle in young embryos.

The connective tissue around the seminal vesicles and prostate was found to differentiate into the fibromuscular covering and framework continuous over both of these structures. That around the rectum differentiated mainly into the areolar or adipose tissue and musculature around the rectal mucosa.

With growth, change in position, and distention of the pelvic viscera, the caudal part of the cavity in the pelvic cul-de-sac of peritoneum was obliterated progressively by the approximation, fusion, and disappearance of the mesothelial surfaces. The connective tissue adjacent to the mesothelium remained as a fibrous membrane throughout development and was present in the adult.

The fibrous membrane derived from the pelvic cul-de-sac of peritoneum contained bundles of smooth muscle fibers. This membrane was "V" shaped and extended from the inferior border of the prostate to the pelvic peritoneum. The arms of the "V" extended laterally behind the seminal vesicles and on the sides of the areolar or adipose tissue around the rectal musculature. This membrane was near to the fibromuscular coverings of the seminal vesicles and prostate and fused with the prostatic covering at the junction of the ejaculatory ducts with the prostate. The endopelvic connective tissue (fascia) fused with the lateral sides of this fibrous membrane.

Fibrous bands, also derived from the pelvic cul-de-sac of peritoneum which during development intervened between the seminal vesicles and the bladder, extended from the superior border to the seminal vesicles and posterosuperior surface of the bladder to the peritoneum.

We suggest that the fascia around the rectal musculature be designated the posterior layer, and that the fibrous membrane, which is derived from the pelvic cul-de-sac of peritoneum, be designated the anterior layer of Denonvilliers' fascia.

In the perineal approach to the prostate, three potential fascial spaces could be developed between the rectum and prostate: (1) between the rectal musculature and rectal fascia (posterior layer of

Denonvilliers' fascia); (2) between the rectal fascia and anterior layer of Denonvilliers' fascia; and (3) between the anterior layer of Denonvilliers' fascia and the fibromuscular covering of the prostate and seminal vesicles.

Since the anterior layer of Denonvilliers' fascia and the fibromuscular covering of the prostate were whitish in appearance and were close together or adherent, either or both of these layers might constitute the glistening layer encountered in perineal exposure of the prostate.

If the fibromuscular covering of the prostate were perforated by cancer or abscess, the fibrous membrane (anterior layer of Denonvilliers' fascia) might prevent direct spread of the malignant growth posteriorly to the rectum and might limit the spread of extravasated pus or urine.

The fascial spaces between the rectum, prostate, and seminal vesicles were separated more readily in our specimens if they had not been compressed by instrumentation *per urethram* or *per rectum* in the first stages of the perineal approach.

Finally the perinephric fascia[15] which embeds the kidneys and ureters, first described by Gerota[16] in 1895, has received much attention and study. However, relations between changes in this fascia and prenatal and postnatal abnormalities in the kidneys and ureters have received relatively little clinical attention. In a study of the continuity of this fascia within the abdomen and pelvis, as demonstrated by dissections and air insufflation, Benjamin[17] and Tobin[18] described patients in whom there appeared to be a relation

15. The terms perirenal and pararenal are commonly used and established in the anatomical and medical literature. However, etymologically, perinephric and paranephric are correct since both parts of these two words are of Greek derivation; whereas, perirenal and pararenal combine Greek with Latin derivations. See F.A. Simeone, *Arch. Surg.* 45 (1942): 424-443.

16. D. Gerota, "Beiträge zur Kenntnis des Befestigungsapparates der Niere," *Arch. f. Anat. u. Entwickl., Anat. Abteil* 19 (1895): 262-285.

17. J.A. Benjamin and C.E. Tobin, "Abnormalities of the kidneys, ureters, and perinephric fascia: anatomic and clinical study," *J. Urol.* 65 (1951): 715-731.

18. Charles E. Tobin, "The renal fascia and its relation to the transversalis fascia," *Anat. Rec.* 89 (1944): 295-311.

between fascial changes and anomalies of the ureters and kidneys. In a newborn female and a newborn male these authors demonstrated that the fascia was absent from the same side as agenesis of the kidney and ureter (ref. 17, p. 716).

The relation between the fascia and congenital anomalies is of special interest. A survey of the extensive literature dealing with anomalies of the genitourinary tract, beginning with the classic studies of Ballowitz[19] has revealed no direct comment regarding the probable significance of perinephric fascial changes in association with abnormalities of the ureters and kidneys. However, suggestion of such an interrelation appeared in a statement by Anson and coworkers[20] to the effect that, "The connective tissue organ capsules function like fascia, separating adjacent structures and apparently of greater significance in the mechanics of embryonic development than has hitherto been appreciated." These observations suggest a question: does an organ program its fascia?

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19. E. Ballowitz, "Über angebornen einseitigen, vollkommenen Nierenmangel," *Virchows Arch. f. Path. Anat.* 141 (1895): 309-390.

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Multiple Ownership of Animals in New York City

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ARCHAEOLOGICAL research shows that human beings and animals have lived in close proximity since prehistoric times. Today animals have a prominent place in our homes, recreation, and work, but little is known about the nature of this relationship or about how to use it to the advantage of animals and men. There is increasing awareness that animals can influence our culture positively (Corson et al., 1975; Friedmann, et al., 1980; Levinson, 1975). There is also an appreciation of some of the problems associated with ownership of animals, especially as regards bites (Beck et al., 1975; Winkler, 1977), infectious disease (Beck, 1975; Shantz & Glickman, 1978), and contamination of the environment (Beck, 1979). However, there has been no study of the social, psychic, or public health consequences of ownership of *large numbers* of animals by individuals in cities. While ownership of pets is accepted in many cultures, including that of urban America, the ownership of large numbers of pets, whether of the same or different species, poses special social, sanitary, and humane problems both for the owners and for the community.

The following study examines individual cases of multiple ownership of animals in New York City. It shows that the reasons and the problems are varied and require a multidisciplinary approach.

The data under study were drawn from the files of the New York City Department of Health (DOH), from analogous records of the American Society for the Prevention of Cruelty to Animals (ASPCA), and from other cases known to the authors. Not all of our cases were included, since some provided insufficient information or involved obsolete problems. New cases that appeared while the study was in progress were included; cases which appeared after the statistical tables had been compiled were excluded. Among the latter was the case of a woman imprisoned for breaking and entering because she had gone into a vacant apartment in her building in order to find additional space for her thirty-four dogs. The dogs all had severe mange and were destroyed by the ASPCA.

For the present study, only persons owning more than ten animals were included; this does not imply, however, that all persons who own ten or more animals necessarily have problems. The cases studied were selected from the period 1973 to 1979; the greatest number occurred in 1977. Because of multiple complaints some of the cases extended over several years and involved lengthy litigation. Others recurred periodically as an increase in the animal population activated new complaints. Complaints are handled by the ASPCA, a humane society chartered in New York State and empowered to enforce the state's humane laws (cruelty complaints), and by the Bureau of Animal Affairs (BAA), which receives complaints pertaining to violations of the New York City Health Code.

A preliminary search for information which might aid us in preparing a profile of the multiple owner revealed several writings of great interest. These included Selby et al. (1979) on attitudes toward dogs and cats as companions, Cameron (1966:1967) on the psychological correlates of pet ownership, and Levinson (1975) on pets, children, and environment.

Classical psychological studies of human interactions with domestic animals, such as those of Freud (1950) on totemism, Krafft-Ebing (1938) on sexuality, Rappaport (1968) on zoophily and "zoerasty," Heiman (1956) on man and dogs, and Tambiah (1969) on animal symbolism, were examined also.

Kinsey et al. (1948), on interviewing techniques, Stack (1974) on urban field work in a northern ghetto, and Powdermaker (1966) on fieldwork in different cultures, were used in the formulation of a questionnaire for guidance of interviews. The interviews took place in the subjects' residences, or by telephone when direct interviews were not possible. Notes were taken by hand, with the permission of the subject, and the data were compiled in a line listing (see Table 1).

The data were divided into three categories: owners of dogs, owners of cats, and owners of other or mixed species. "Mixed species" refers to cases in which no species predominated numerically. "Other species" designates cases in which there is a predominant species other than cats or dogs, e.g. birds. It was often found that subjects kept one species of animal predominantly, but owned a few animals of other species in addition, e.g. twelve cats and three dogs. In these cases the subject is listed under the most numerous species. Many subjects interviewed who owned large numbers of

OWNERS OF CATS

SEX	AGE	BOR.	NUMBER OF ANIMALS	COMPLAINT
F's	30's	Man.	52+	Attempted Suicide
F	-	Man.	70+	Abandon
-	-	Bronx	10/15	Odor
-	-	Bronx	12	Odor
M	40's	Man.	17	Odor
				Abandon
				Odor
F	30's	Queens	35+	Child Welfare
F	30's	Bkln.	27	None
F	70's	Man.	25+	Odor
				Odor
F	60's	Bkln.	22+	Health
F	30's	Queens	22	None
F's	40's	Bkln.		Nuisance
F/M	40's	Man.	16+	Odor
				Nuisance
M	14	Bkln.	40+	Health
M	20's	Man.	20+	Boarding

OWNERS OF DOGS

SEX	AGE	BOR.	NUMBER OF ANIMALS	COMPLAINT
M	60's	Queens	30	Odor Nuisance
M	60's	Bronx	10+	Cruelty Nuisance
F	30's	Queens	22+	Child Welfare Odor
F	60's	Man.	17+	Nuisance
F	-	Bkln.	11	Odor Odor
F	65	Bkln.	17	Sanitat. Odor
F	60's	Bkln.	32	Sanitat.
F	60's	Man.	61+	Nuisance Odor
F	40's	Queens	15/30	Sanitat. Police
M	50's	Bkln.	10+	Missing Person Odor
F/M	-	Bkln.	11	Noise Illegal
F/M	-	Bkln.	11+	Boarding
M	30's	Man.	17	None

OWNERS OF MIXED AND OTHER SPECIES

SEX	AGE	BOR.	NUMBER OF ANIMALS	COMPLAINT
F	40's	Man.	30+	Odor Nuisance (Police
F	30's	Man.	50+	Missing Person)
F	30's	Man.	20+	Hospital Snake bite
M	30's	Bkln.	10/15	Police; Escaping Poisonous Snake

cats also had several dogs, but none who owned numerous dogs had any cats. This raises a question as to the factors involved in the choice of the species to be collected. Are persons who collect both species more liberal in their attitudes, as Selby et al. (1979) suggest? Are owners of dogs more restricted in their tastes than owners of cats (Wallin, 1978)? Also, why are owners of mixed species younger than owners of one species?

This list contains data about thirty-six persons and refers to thirteen canine cases, fourteen feline cases and four mixed and other species cases. The average number of animals in the study population was 34 cats or 23 dogs per owner. The three cases of mixed species differed widely and involved a total of three dogs, two cats, two alligators, several large lizards, many poisonous snakes, nine rabbits, twelve turtles, one turkey, several ducks, and one tarantula. The single "other species" case involved more than fifty pigeons and other wild birds flying freely in an apartment. Their owner removed them to another room, where they were kept while new birds were being captured by means of food placed on window sills. None of the birds were allowed to leave the apartment. This owner also had several cats.

In cases of this kind it is extremely difficult to enumerate the animals accurately, as they are usually uncaged and often hide in closets and under furniture, especially when they are approached by strangers, such as health inspectors and ASPCA agents. For this reason, our records often could not represent the owner's entire holdings.

Epidemiological information sought in the present study included the owner's age, sex, place of residence, socio-economic and marital status, family size, and education.

While the mean age was higher for owners of dogs (60s) than for owners of cats and mixed and other species owners (30s), the range for all species owners was similar. The ages stated are the subjects' ages at the time of the study, although most of the subjects had had many animals in previous years.

The male-to-female ratios were 3:8 (there were two unknowns and one couple) for owners of cats, 4:7 (with two couples) for owners of dogs, and 1:3 for mixed and other species owners. Females obviously predominate as multiple owners. Males were most often involved in ownership of dogs, which raises a doubt regarding Selby's suggestion that dogs are preferred by persons who have the stronger

nurturing tendencies (Selby et al., 1979). We should consider whether these males could be identifying with masculine canine traits, e.g. aggression, and examine whether caring for a dog is perceived as an acceptable form of nurture by males.

The study population resided in the boroughs of the Bronx, Brooklyn, Manhattan, and Queens. No cases were recorded from Richmond (Staten Island), which maintains autonomy in the handling of complaints within the city system (See Table 2).

Manhattan had 0.8 cases per 100,000 people, a notably higher ratio than the other boroughs. Manhattan also had more persons living in higher densities, a factor that may reduce tolerance for multiple ownership of animals.

In thirty-nine cases, one subject had died and three changed residence at the time of the study. Only eight of the subjects listed in DOH and ASPCA records had telephones. A notable proportion of these people had no public utilities and several had no plumbing. One woman had in her apartment a room filled with newspapers containing piles of feces. The interviewer was not able to ascertain whether the feces were of human origin.

In cases where it was not possible to interview the person directly involved contact was attempted by means of mailed questionnaires and by discussion with neighbors, building personnel, veterinarians, and social workers. Records of television stations and newspapers were used, also.

Thirty-six persons involved included twenty-four Caucasians, two blacks, two Hispanics, two Orientals, and six persons of undetermined racial background. Certain ethnic groups seemed to predominate, but this information was too scant to assess. Ethnic attitudes towards animals offer fascinating possibilities for research.

The socio-economic data suggested bias in reporting. Most cases recorded by agencies involved members of the lower and lower-middle class. Inquiries, however, soon confirmed that multiple ownership of animals extends across the entire socio-economic spectrum. Therefore it was decided to interview middle and upper-middle class multiple owners identified through personal contact. More references were received through these personal contacts than could be investigated. It became apparent that multiple ownership is much more widespread in New York than these records indicate. A larger study is necessary if a comprehensive picture is to be obtained.

The cases examined occurred in areas in which the occupants are

TABLE 2: Multiple Owner Population: Distribution by Borough

ANIMALS OWNED	MANHATTAN	BRONX	BROOKLYN	QUEENS	TOTAL
Cats	6	2	4	2	14
Dogs	3	1	6	3	13
Mixed & Other Species	3	0	1	0	4
Total	12	3	11	5	31
Cases/1,000,000 people	0.8	0.2	0.4	0.3	0.4
Human Population (millions)	1.45	1.39	2.48	1.97	7.62

recorded officially as having mean income levels of $6,491 to $43,191 per year. All but two of the cases took place in areas that were predominantly white and which the majority of housing consisted of rentals.

All the persons interviewed had secondary level, and in some cases, college educations, and they tended to be very articulate. Three held law degrees. No pattern was observed in the educational data. It was observed, however, that income was not the deciding factor in the accumulation of animals. Low-income persons sometimes suffered increased financial and interpersonal difficulty because of their accumulation of animals. Landlords in the lower and lower-middle class houses were very often reluctant to become involved in these problems or were absent, while middle and upper-class landlords tended to intervene. The lower income groups had only the Department of Health and the ASPCA to resort to for complaints, while the middle class had several outlets including litigation. This situation created biased socio-economic representation in the records of agencies.

Marital status was ascertained when possible (see Table 3). Possible racial bias in case reporting was checked by interviewing ASPCA and DOH personnel who had worked in minority neighborhoods and by cross-checking their information with that of persons from the Department of Social Services of the City of New York who had worked in the same neighborhoods.

Different patterns of ownership were noted in Harlem, where they seemed to reflect the patterns of kinship that were found by Carol Stack (1974) in a black neighborhood in the northeast. In Harlem, while many animals are owned privately, there are also groups of animals, mostly dogs which belong to "the block", i.e. they have no constant homes but are cared for by different persons at different times. They are not really strays, as they are known to the neighborhood people with whom they board (see Beck, 1973 for field observations of "animals of the block" in Baltimore). These differences may reflect social adaptations to urban poverty and to the welfare system more than differing racial patterns of ownership, and they deserve investigation.

Some residents of Harlem were also observed to maintain groups of stray animals in apartment house basements and abandoned buildings. These cases were seldom reported. The animals were usually removed as strays and the case closed (Plaza, 1978-79).

The type of complaint that brought each case to the attention of the present authors is noted in the tables. The presenting complaints included: child abuse; cruelty to animals; noxious odors; noise; disappearance of kinsmen (in two of the cases the discovery of a corpse led to the discovery of the animals); infectious diseases; attempted suicide of an owner (who had had a fight with her lesbian lover); animal bites; free-roving animals; nuisance; and destruction of property. Examination of the 1978 files of the BAA showed that recorded complaints of multiple-animal ownership accounted for one out of every ninety-nine complaints received in the city. Although only 29% of all animal related complaints originated in Manhattan, that same borough accounted for 47% of complaints about multiple owners. The high density of apartment dwellers in Manhattan would predispose residents to generate complaints. There may also be higher awareness of the animal complaint system in Manhattan, an area covered intensively by news media.

Although some of the cases described involve behavior that appears bizarre or self-destructive, few of the persons interviewed could be described as overtly psychotic. Though most of the subjects interviewed had serious problems connected with, or stemming from, their ownership of numerous animals, they had somehow maintained themselves and their animals with varying degrees of success. It was also very difficult to ascertain at what point their relationship with their animals might have become neurotic.

The pre-existing stereotype of the multiple owner — often referred to as "animal crazies", "humaniacs", "lolits" (little old ladies in tennis shoes) — was that of a white woman, past middle age, who had the animals because she was lonely (Keddie, 1977:24). This image resembles seventeenth-century portraits of witches, who were also noted for their connection to animals, especially cats and goats (see Summers, [1928] for traditional portraits of witches). Animals owned by women were often characterized as substitute children or lovers (Heiman, 1956). Initial interviews confirmed the observation that most owners of numerous animals were female. Our statistics, however, show that multiple ownership is not a phenomenon of middle age. A veterinarian who had multiple owners as clients pointed out that the majority were young, attractive, well-educated women who had responsible jobs and led active social lives. Among these women cats were the favorite animals, in part because cats are

TABLE 3: Marital Status and Sex of Multiple Owners

STATUS	OWNERS OF CATS	OWNERS OF DOGS	OWNERS OF CATS & DOGS OR OTHER SPECIES
Female Single*	7	4	3
Female Married*	4	3	0
Female Unknown	0	2	0
Male Single*	3	2	1
Male Married	1	3	0
Male Unknown	0	1	0
Sex & Marital Status Unknown	2	0	0
TOTAL	17 (14 cases — 1 couple & 2 joint owners)	15 (13 cases — 2 couples)	4 (4 cases)

*Single includes separated and divorced persons.
Couples (those jointly listed in the records) are counted twice — once as female married and once as male married, except for one lesbian couple and a mother & daughter who are listed respectively as 2 female single and 2 females married.

more easily accommodated than dogs to urban conditions. The animals owned by these women were all strays, found by the women or their friends.

The consequences of harboring multiple animals appeared to follow a pattern. The acquisition of the initial animals presented no problems. As income increased or circumstances favored increase in numbers, difficulties arose in the control of respiratory infections and parasites, in providing vaccinations, and in spaying or neutering new pets. As one subject related, her holdings increased greatly after she underwent a surgical operation and became unable to travel. Her system of adoption, which included delivering all the animals personally to new owners, collapsed but she did not stop collecting cats. Thus her animals accumulated and sickened.

Such problems arise at different times, depending on the owners' physical and monetary resources and on their attitude toward their animals. Most persons who take in strays limit the colony in order to maintain the health of the animals and hence are different from the subjects of the present study. Those who did not impose limits were usually the persons who came to our attention because of complaints lodged with the Department of Health and the ASPCA.

Complaints pertaining to the health of the animals or of persons involved with them are handled by the Health Department's Bureau of Animal Affairs under the New York City Health Code, Articles 311 and 161 (sections 161.01 through 161.25). When summonses have been given by the DOH or the ASPCA, and the respondent fails to appear in court and the complaints continue, a search-and-seizure warrant is obtained. Then a joint inspection is made by enforcement officers of the ASPCA, the Health Department, and the New York City Police Department. In cases where such action is necessary, the persons involved may be committed to a mental health facility for observation, or may be arrested and subjected to criminal charges.

Subjects who had been committed for psychiatric observation or who had been arrested, described great personal trauma. One subject had been arrested for assaulting an enforcement officer who was removing her child and her pets from her home. She was held for seventy-two hours in a large hospital. She asserted that no attempt was made to treat her, and that she was not allowed to telephone to her family. The admitting doctor at the hospital was a foreigner whose English she found unintelligible and who allegedly

described her as incoherent because she could not answer his questions.

Another subject was offered psychological counselling by a community agency. She refused, saying that if she were left alone with her animals she would do well. On psychiatric examination she was found to be depressed and out of touch with reality, especially as regards her environment and her relations with other persons. She subsequently refused entrance to an agent of a city counselling service.

One woman was seen by a psychiatrist and diagnosed as a zoophiliac. No treatment was recommended since it was felt that at her age (mid to late 60s) she was unlikely to change. Moreover, she was unable to pay for medical care.

Conversations with mental health personnel in both public and private institutions revealed that few of them had been exposed to the problems observed in our patients and that no publications dealing specifically with the phenomenon of multiple animal ownership were readily available. One psychiatrist told of a patient who had been considered paranoid and who believed that if people could see his eyes he would be revealed as a homosexual, although he was not. While in the hospital this patient started to collect cats and to care for them. His relationship with them was his only affective personal relationship (Schwartz, 1979).

The present study indicates that social isolation did not appear to be prerequisite to the accumulation of animals but more often was an outcome of it; most of the subjects had families, lovers and friends. As animals accumulate, people's lives usually undergo drastic changes.

It was noted that many of the subjects accumulated other objects in addition to animals. Some of them lived amid debris piled to the ceiling. The objects accumulated were, like the animals, collected from the street, and ran the gamut from antique furniture to discarded containers and garbage. One woman insisted that Jesus had ordered her to collect and protect dogs. She collected trash to see if there was anything "that the dogs could use". Collecting, however, was not characteristic of all our subjects. Some lived in virtually empty spaces, with only a bed for themselves and dishes for feeding animals. Some owners lived in hotels and had no personal effects.

Whether or not the subjects were "collectors," the inevitable

increase in the number of animals created problems. One couple that owned many animals alloted a time every night for sewing up new tears in the upholstery of their living-room furniture. An officer of the ASPCA described a family of three which lived in one room of a four-room apartment because the other three were the domain of their dogs. Another man's dogs caused more than $20,000 damage to his home as the number of these animals increased more than threefold (Plaza, 1978-79).

That humans can contract diseases from animals, i.e. zoonoses, has long been recognized. More than 100 different zoonoses have been reported in the United States. In addition, animal bites, especially from dogs, have become numerous (Beck et al, 1975; Harris et al., 1974; Winkler, 1977). It is not clear how many specific zoonotic incidents have been associated with multiple ownership of animals. However, one of our subjects had received 13 bites inflicted by his animals. External parasitic infestations, mainly from dog fleas, were found in several cases. After the study was completed, a report was received of an elderly woman who died of pulmonary complications from a *Pasteurella multocida* infection. This organism occurs frequently in feline saliva. This woman had lived with more than 20 cats.

One might believe that owners of numerous animals would be the foci for zoonotic diseases such as animal bites, visceral larval migrans, or psittacosis. Animals retrieved from such owners are usually found to be infected with diseases of the skin and upper respiratory tract typically associated with high-density living. Although most of these diseases tend to infect only animals, skin diseases have infected people. Despite the potential for transmission of disease from homes harboring large numbers of animals, the primary complaints were odor, noise and aesthetic nuisances associated with large populations of animals kept in small spaces. Annoyances of this kind create stress for other members of the community and should be recognized as a public health problem that requires intervention.

Many subjects were eventually forced to change their residences in order to provide additional space for animals or to escape from complaining neighbors. Because of growing maintenance problems these owners often stop inviting friends to their homes, or their friends decline to visit them. The problems can disturb personal relations.

Another woman included in the present study described the effect of her animals on her love life. Men who disliked animals or were allergic to them had to be dropped, and a current beau was jealous of the amount of time and attention that she devoted to her animals. One response to the impact of animals on the social lives of their owners is a dating service specifically geared for single people with animals (Evans, 1979). Weekends and travel also created problems. One couple was obliged to take separate vacations because of their animals.

One of the most difficult problems encountered by the multiple animal owner is population control of the animals. Mistakes, miscalculations, or laxity often result in unplanned litters which further enlarge the colony.

When couples are multiple owners, one member tends to resist the acquisition of additional animals. One such case involved a husband who had brought the first animals into home from his place of work. The wife accumulated others. Several of the animals bred. Soon the couple found themselves in a one-room apartment with nineteen animals. The husband insisted on keeping only a few of the original animals. This precipitated a marital crisis in which the wife threatened to get rid of the husband instead of the animals. Another couple admitted their holdings were a compromise between the number of animals wanted by the husband and the number the wife would tolerate.

One woman interviewed had more than one hundred cats in addition to several dogs. This collection started as a group of twenty-six and was enlarged by cats received from a humanitarian organization. Not all of the cats in the latter group had been spayed or neutered. As the animals began to breed, the woman could no longer control the situation.

Multiple owners often prove unable to dispose of new litters even when appropriate homes are available. This difficulty may reflect the subject's imagined parental role toward his animals. Owners often found reason for refusing adoption, or they retrieved animals from adoptive homes, asserting that the new owners had failed to provide the animals with their favorite foods. Sometimes they objected to the adoptor's marital status, sexual preference, or race; or they alleged cruel treatment. The last factor is difficult to assess since cruelty undoubtedly occurs in some adoptive procedures, often through neglect. Adoption may also be discouraged by

unsanitary conditions caused by other animals in the home. One such feline population suffered from malnutrition, ear mites, mange, worms,and chronic diarrhea.

Intense personalization of animals was exemplified in different forms of anthropomorphism. One woman kept scrapbooks of her animals' lives, celebrated their birthdays and anniversaries and conducted special burials for them. Another elderly woman, unable to bear separation from her dead cats, eviscerated them and dried them on her fire escape. The resultant "cat boards" were kept in cupboards throughout her apartment.

Preservation by stuffing was also observed. One subject had her favorite cat stuffed; it was kept on a satin pillow under glass in her living room. Such incidents show that these people think of animals as part of their own intimate social group; their attitude explains their difficulty in parting with them (animals as surrogate relatives have been discussed by Keddie, 1977). All of the subjects had in their collections some animals which they allegedly were eager to "find homes for", but they said that no one seemed to want these animals.

Strays are much more numerous than people who want them. Many accumulators, unable to tolerate the thought of euthanasia, feel that they must help save the lives of as many strays as possible. Other persons play on this notion by bringing them all the animals they find, thus exacerbating the problem. Some of the subjects also feel that only they can help the animals. In a quarrel over the "ownership" of a group of strays living in abandoned buildings on Manhattan's west side, two "cat ladies" exchanged threats and one wielded a knife.

Once a colony of animals is out of control, the owner usually feels helpless to change the situation although he may be aware of its dangers to the animals. Some of the subjects expressed a desire to reduce their animal population "if only it were possible." Others appeared oblivious to the effect on themselves, and expressed concern solely for the welfare of the animals. One woman lived in an abandoned building for nine months and refused relocation by the municipal authorities, even though she had been robbed five times, because relocation would have entailed abandoning her twenty-two cats. She was successfully relocated only after private donations had provided medical care and temporary placement of her cats with other animal lovers. It is not unusual for multiple animal owners to help one another by harboring a colony temporarily.

The woman who had more than one hundred cats said that her neighbors, who had placed complaints against her, had "really done her a favor in the long run"; a court ordered the removal of all but four of the cats. Judicial precedent allows multiple owners brought before the court on health violations to retain two to four of their animals; the precedent implies recognition of the importance of the animals to the emotional well-being of the owners. Keddie (1977) has discussed the psychological effect of loss of pets.

The Enforcement Division of the ASPCA has been counseling some multiple owners informally in order to try to prevent recurrences of their problems. Our study shows that such assistance programs, combining personal counseling with instruction, would be more effective than the present system of summonses and seizures that are time-consuming and expensive. Such programs, however, must be based in better understanding of the psychological implications of multiple ownership than now exists.

While all the subjects expressed a love of animals and intense concern for the welfare of strays, they held divergent views on why they felt as they do. One woman thought that perhaps she had been a cat in another life. Several said that the animals were their children. One man felt that he was a member of his dog's social group, and he took great pleasure in his membership (see Fox, 1975:48). Pleasure in physical contact with the animals was expressed frequently, although no one mentioned sexual pleasure as the motive for having many animals.

The effect of physical contact between people and animals may be important and has only recently been investigated. Studies indicate that ownership of pets is significant in survival after a heart attack (Friedmann et al., 1980). Many of the subjects interviewed expressed appreciation of the unquestioning and uncritical love that animals gave them (see Wallin, 1978). The majority of multiple owners, however, said they did not clearly understand why they responded so strongly to animals.

The data were studied in an attempt to find common denominators among the population. Although most of our subjects were female and unmarried, others were included (see Table 3). Interviews yielded one significant finding; all these people had developed strong feelings about animals very early in childhood. It did not seem to matter whether or not animals were present in the home. One woman had smuggled her first cat home in a doll

carriage at the age of four, and had it hidden in her room for several days before it was discovered. Many had not been allowed to have animals, although all said they had tried to have them. One subject, who had lived abroad during much of childhood, had had a menagerie that included a horse, two goats, guinea pigs, pigeons, a fighting cock, ducks, chickens, parrots, dogs, small crocodiles, and tropical fish.

In every case the formation of large collections began after the subject had left the parental home and had established his own permanent residence, most commonly in the late teens or middle twenties. The subject thus confirmed the veterinarian's opinion that the phenomenon first occurs in young adulthood rather than in middle life, although the origins are in early childhood.

Several subjects volunteered interpretations of their collection. One stated that she was attempting to resolve her own adoption, which she recreated with the animals. A psychiatrist remarked that adopted children are often intensely involved in such relations with animals.

Loneliness and social isolation have often been suggested as primary motives for much ownership of pets. Is there then the suggestion that increased loneliness could be assuaged by the accumulation of additional animals? Also, how should one judge the humanitarian argument that these people are simply trying to help strays although they sometimes create conditions that are far from humane?

One health professional who had treated a multiple owner (a married woman with several children) suggested that these persons use animals to cope with an emotional problem created by lack of self-esteem and to fulfill a need for uncritical, i.e. non-threatening, love. Because such a problem cannot be reduced by external measures, continued collections of animals or other objects become a necessity for them.

Lynch (1977) has asserted that mature adult love is based on continuous dialogue between partners. Multiple owners turn instead to their animals who are non-verbal. This raises the question: are these people capable of sustained dialogue?

In addition, it has been demonstrated that infantile human characteristics (pedomorphy) elicit powerful emotions in people. Dogs and cats, whose juvenile qualities persist into adulthood (neotony), evoke similar responses (Gould, 1979). Like infants,

these animals have disproportionately large heads, seek out human contact and are non-verbal.

Bizarre examples of multiple ownership were suggested in two of our cases. It was believed, but not proved, that two men, one of whom collected dogs and one cats, used them as sources of food. One case came to the attention of the Police Department during an investigation of a missing person. The person was found tied into a chair in his brother's home. He had been dead for about six months. The neighbors who had entered the complaint were also concerned about the disappearance of these men's parents several years earlier. A search revealed no further bodies and no charges were filed. Two years later the ASPCA received a nuisance and sanitary complaint for the same address. Inspectors found a large meat grinder in the kitchen and canine carcasses, with the rib sections missing, embedded in the walls of the house. There were also dogs at large on the premises. The City condemned the building. The man was removed and enrolled as a recipient of Social Security; he had no income and his home lacked heat and plumbing. Later the ASPCA learned that a person who fit this man's description was collecting stray dogs in Brooklyn. Investigators found that the man had changed his residence and had not collected his Social Security check.

In another case of multiple ownership the subject kept a human cadaver in her home. The situation was discovered when maggots from the corpse invaded a neighborhood apartment. The subject lived with about fifty wild birds. When removal became necessary she threatened suicide. Another case involved a dapper, middle-aged man whose neighbors believed he was collecting stray cats for stews. The claim could not be substantiated.

Multiple animal ownership was found to be common in the metropolitan area of New York City and to occur across the entire socio-economic spectrum in all adult age groups of both sexes. The data also suggest that the response of young children to animals and animal surrogates might yield indices of the trajectory in their emotional development (Seifert, 1979:13-14).

It is hoped that the present study will stimulate the thinking of anthropologists, psychiatrists, child development specialists, and public health professionals concerning the cultural, psychological, and medical importance of multiple animal ownership.

The study was funded by a grant from the Health Research

Training Program of the New York City Department of Health and The Graduate Center of The New School for Social Research. We are grateful to the members of the Department of Health and the American Society for the Prevention of Cruelty to Animals for their help with the study cases. For assistance of various kinds, the authors thank Dr. Shirley Lindenbaum, Lenore Deutscher, William Steerman, Dr. Victor Robinson, Eric Plaza, James Hill, Florence Giordano, Joseph Rosenfeld, Dr. Howard Levin, Dr. Edward Foulks, and Betty Johnson.

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Medical Language: An Exclusive Code

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THE aim of this essay is to show that medical language, technical languages in general and national languages are not intended to communicate; communication is not their principal purpose. This premise accords with the perception of Ludwig Wittgenstein, for whom philosophy was a clarification of the logical process through a critique of language and whose work underlies modern linguistic analysis, "Language disguises thought. So much so, that from the outward form of the clothing it is impossible to infer the thought beneath it, because the outward form of the clothing is not designed to reveal the form of body, but for entirely different purposes."[1]

Scholars in linguistics agree that the relation of language to thought is obscure.[1-3] Physicians dedicated to improving communication among doctors and between physicians and lay people agree that the relation between medical language and medical thought is more obscure than it needs to be[4]. I shall try to demonstrate that this obscurity is deliberate — conscious or unconscious, but deliberate all the same; and that it is a property of all kinds of language to be cryptic on purpose. Further, it will become clear that the intentional cryptography of language springs from deep visceral roots. Because the use of language for various kinds of concealment is so intimately embedded within the human organism, it follows that linguistic obscurity is not new.

Spoken human language is estimated to be about 100,000 years old in Western Europe. The earliest known written language of Western civilization dates from 4,000 B.C. in the form of Sumerian cuneiform characters;[5] in the East, the most ancient writings are the oracular pictographs found in the Chinese bone and shell carvings of Shang. It is difficult to decide whether these earliest hieroglyphs first depicted things or ideas. One standard view is that when words became the coin of language, they first represented things, then, much later, ideas.[6] This opinion would be consistent with a perhaps fanciful eighteenth century notion, here given as misquoted by Samuel Johnson: "words are the daughters of the earth, and ... things are the sons of heaven".[7] The concept of the *word* as primal, in a

different sense, is set out by the gospel writer: "In the beginning was the Word, and the Word was with God, and the Word was God" (John 1:1). If we avoid the complex theological concepts implicit in what is translated from Hebrew and Greek as *Word,* it is likely that in the beginning was the song or the grunt or the yell. Charles Darwin concluded that the origin of language was love and music: "Language owes its origin to the limitation of various natural sounds ... primeval man probably first used his voice in ... singing ..., this power would have been especially exerted during the courtship of the sexes — would have expressed love, jealousy, triumph"[8].

There is a tradition, in which there is probably some truth, that an early use of language was in connection with community-building; the parochial needs of putting together a community would be at least two — to bind its members together and to exclude outsiders or strangers. The written version of Genesis, believed to have been composed in 600 B.C., tells this story of the people of Babylonia: "And they said, Go to, let us build us a city and a tower, whose top may reach unto heaven; and let us make us a name, lest we be scattered abroad..." (Genesis 11:4). "Let us make us a name" means to me, "Let us make an identity for ourselves, something that keeps us together, makes us unique, marks us off, sets us apart from others". The phrase also suggests, "Let us make us a language". Up to that time, according to the folklore, "...the whole earth was of one language and one speech" (Genesis 11:1). Also not likely, but likely or not, the building of this separatist community, the tower of Babel ("Babel" is the Assyro-Babylonian word for "gate of God") which was designed to reach heaven, "incurred the wrath of God.". *Hubris* was evidently not confined to Greece. Ironically, God, "as punishment made the builders' speech mutually unintelligible" (Webster) so that not only was the community separated from outsiders, but each member of the community was separated from his neighbor and language became a divisive force: "let us ... confound their language, that they may not understand one another's speech. So the Lord scattered them abroad from thence ... Therefore is the name of it called Babel; because the Lord did there confound the language of all the earth: and from thence did ... scatter them" (Genesis 11:7-9). Whatever was the origin of regional and national tongues, the history of civilizations is a record of peoples babbling their own meaningless sounds, unintelligible to strangers.

It is a truism that separate languages divide. Much is lost in

translation. As with translating poetry into prose in the same language, fine shades which cannot be brought across linguistic barriers make big differences when translating from one language to another. During the Opium War of the 1840s, a Chinese official in a communiqué to his British counterpart quoted St. Paul: "O grave where is victory, O death where is sting?" (1 Corinthians 15:55). Omitting the "thy" in each clause and thus destroying the iambic rhythm of the original — "O death where is thy sting? O grave where is thy victory?" — does not seriously impair the meaning but imparts an unintended comic flavor which Paul certainly did not mean to convey. It is all reminiscent of the remark attributed to the composer, Arnold Schoenberg: "The Chinese philosopher speaks, of course, Chinese; the question is, what does he say?"[9].

Let me present several examples of nearly unintelligible writings by members of various communities. All of these, conceived and written in English, illustrate the conclusion of Wittgenstein: "Language disguises thought ..."[1] I contend that the disguise in each case is deliberate, whether conscious or unconscious. One reason for making this claim is my long-held conclusion about the almost universal inability of human beings, even of very intelligent ones, to remember the names of people they have just met face to face. These people, newly met, are, of course, new, therefore strangers, and therefore threatening. The "forgetting" of the new name is not a forgetting but a rejection. The stranger, a large literature tells us, is a threat and may possess magical or esoteric powers. So, as a defense, we do not forget his or her name; we never let it into the center of our being. We keep the rascal out; we exclude the stranger. This notion may seem fanciful; this writer continues to be more convinced of its accuracy as he tries without success to persuade others, including psychoanalysts, of its validity. The mere idea, touching upon strangers, is threatening and therefore unacceptable. The following are intended to show that, as with personal encounters, so with linguistic exchanges: the desire, perhaps the need to hide and to exclude "the other" is so fundamental and so strong that the main business of speech and writing has become this — to disguise, conceal, evade, escape, exclude.[10] Communication of the radical thought, if that occurs, is accidental. "Let us make us a name, lest we be scattered ..."; "... the question is, what does he say?"

What does this legal phrase say: *per stirpes*, an expression that appears in everybody's last will and testament? *Stirps* is a Latin word

meaning 'stem, root, stock' (see our derived word *extirpate*, 'to pull up by the root[s]'); *per stirpes* is to be distinguished from *per capita*: 'equally to each individual'. The dictionary "translation" of *per stirpes* is not easy to grasp on a first, second or third reading: "by familial stocks: as representatives of the descendants of a person — used of a mode of reckoning the rights or liabilities of descendants in which the children of any one descendant have or take only the share that their parent would have taken if living" (Webster). How much? Share of what? Now we see the need for lawyers and their linguistic function. We require their services as translators. As translators, they would prefer to have ordinary people remain ignorant of legal language.

The dialects of professions or other special forms of activity are for keeping secrets. Initiates can understand; outsiders remain outside, looking in uncomprehendingly. "The next move was to finesse the club nine successfully and ruff the last diamond with the club jack..." Club nine — is it about warfare? Club jack — is it about automotive repairs? Ruff the last diamond — is it a bad pun about a diamond in the rough? None of the above is correct. Any cardplayer recognizes the passage as an excerpt from the bridge column of the *New York Times*. "...Skip first sc, work one sc in next space, ch 1, * in next space work 1 sc-ch 1 and sc for an inc, ch 1, 1sc in next space, 1 sc-ch 1 and 1 sc in last space, ch 1: 24 sc and 24 ch 1 spaces 24 pats around." The first question to ask about that is how to tell if it is correct or not. The second is, is it in English? The third, what is it about? Is it in code? Is it pornographic? Is it interesting? It is, to some. Anyone who knits can understand these instructions, something to do with a braided knot. If we do not knit, we are not supposed to understand. The Chinese philosopher is addressing an in-group.

"Subtle shifts of sonorous balance serve to delineate phrase structure in a texture where cadential articulation, no matter how tangentially and sparingly used, can easily create sonorous inconsistency. ...Unique timbral characteristics serve to endow an ambiguous harmonic aggregate with an individuality which makes it possible for it to function referentially in the role of a 'tonic sonority'." Overlooking the grammatical tangle that conceals what the two "its" refer to (the same thing? two different things? more than two? which? which refers to what?), one can make out that those sentences are in English. The topic might be acoustics, vatic

poetry, physics. It is none of those, but a commentary on the string quartets of Béla Bartók, from a 1949 program note written by Milton Babbitt, a respected *avant-garde* composer, of whom it is said that he has no desire to communicate musically with the public, with an audience, but would prefer to exchange ideas with his fellow faculty members at Princeton, where he is Professor of Music. The Chinese philosopher speaks Chinese to his comrades, other Chinese philosophers.

On a homelier level, let us talk of sports, diversions, games, fun for everyone: "However, after 4 P-K5, KN-Q2; 5B-Q3, P-QB 4; 6P-QB 3; 7N-K2, he did not want to continue with the colorless 7 ...PxP; 8 PxP, Qn3; ...B-Q3, which gives Black reasonable chances of holding his own. Instead, he deliberately ..." Not about mountain climbing (K2); not competitive painting by the numbers (colorless, Black); not lacrosse; rather, a description of a chess game from the *New York Times*, March 7, 1979. What does he say? The writer speaks only to other chess players. Some of the fun must lie in playing an arcane game that the rest of us do not understand. The game of intellectual snobbery is more fun than almost anything, inexpensive, gratifying, only moderately offensive.

Through habit, the reader condones the obscurity of these special jargons. One might suppose that theological writings which treat of universal matters important to all, ought to be lucid, ought to enlighten the reader. Their purpose is to clarify, to edify, to prosetylize, to convince, to influence toward grace. Let us see how St. Thomas Aquinas (1225-1274) provides illumination in this persuasive segment from the chapter, "God is not a body" in the *Summa Contra Gentiles*: "If any finite power of a body causes movement in infinite time, a part of that body having a part of that power, will cause movement during less time, since the greater power a thing has, for so much the longer time will it be able to continue a movement, and thus the aforesaid part will cause movement in finite time, and a greater part will be able to cause movement during more time. And thus ..." The Italian philosopher and theologian speaks of course Latin; as with his Chinese colleague, the question is the same: what does he say? It may be that opacity is permissible when one is preaching to the converted. Under those conditions, any form of incantation can legitimately replace the clear communication of thoughts.

Leaving aside the priestly functions of the physician[11], there are

several reasons for clear communication in medicine. "Language which does not convey a clear meaning fails to perform the very function of language"[12], wrote Aristotle in the *Rhetoric*. For the sake of his humanitarian function, the physician needs clear communication with patients. For the sake of science, a mandatory "function of language" is to impart clearly the names of things and to explain processes and concepts. In spite of these and other evident needs for clarity, the language of medicine has never been clear.[4,10-14] The increasingly technical nature of modern medicine accounts for only a part of the obscurity.[4] One has only to read Rabelais (1494-1553) and Molière (1622-1673) — especially in *Le Médecin Malgré Lui*, 1666, and *Le Malade Imaginaire*, 1673 — to find hilarious if sarcastic references to the deliberate and ostentatious pedantry of doctors. Michael Crichton has rediscovered how purposeful medical pedantry is[13]; he has exhumed this revealing prescription by a 13th century surgeon, Arnold of Villanova: "Then say that he has an obstruction of the liver, and particularly use the word, obstruction, because they do not understand what it means, and it helps greatly that a term is not understood by the people."[13] Arnold understood very well the use of language as the "disguise of thought."[1,10,13] We may assume that linguistic concealment was a definite characteristic of doctors by the 1200s, and well enough entrenched as a defining attribute and as a proper object of disapproval to serve as a recognizable target for literary and theatrical satire three and four hundred years later.

The display of medical knowledge or pseudo-knowledge and the use of medical cant to hide ignorance or to show off are familiar failings, human enough to be forgiveable if not endearing. Students of medical obscurity have identified many other causes, less loveable than the above, that help to explain this disease of language and provide reasons for its prevalence, persistence and virulence. The etiologies are deep, deeper than simple pedantry, and as widespread and as ancient as those we encountered in Genesis 11.

Crichton has labeled the disorder "medical obfuscation", that is, darkening, obscuring, confusing.[13] The symptoms are many: poor flow of ideas, verbiage, repetitiousness, wrong words, bad syntax, and too much abstraction, complexity, compression and qualification, all of which can be ascribed to a single cause, the "display of scientific profundity [actually, of would-be scientific profundity], and not ... an attempt to communicate experience."[13] If I may be linguistically strict, maybe to the point of pedantry, what Crichton has described is

more accurately called "obscurantism": "obscure utterance ... one intended to confuse ... opposition to the spread of knowledge ... a policy of deliberately making something obscure ... or withholding knowledge from the general public" (Webster). "Obscurantism" more forcefully than "obfuscation" expresses the idea that obscurity is being perpetrated on purpose, whether the audience is one of patients or of other doctors.[13]

Other causes of obscure medical writing are sociological and cultural: defective early education in the use of language[14], unfettered overgrowth of technological language, the authorship of most medical and scientific papers "by committee", and a general failure of physician-writers to familiarize themselves with good literary models — that is, doctors do not read books of decent quality[4].

As you continue to study the obscurity of medical language you feel you are discovering more and more profound reasons for it, getting closer and closer to the bone. It is like peeling an onion, but as you peel away layer after layer, you begin to suspect that the dimensions of the onion are without limit, infinite. An obvious reason for hasty and slipshod composition is the pressure to publish in order to advance one's own career[14]. Another reason, obvious when one thinks about it but lying a little deeper under the skin is indistinctness of thought; there are several manifestations: doublethink, doubletalk, the Mount Everest Syndrome (the carrying out of purposeless and inane investigations simply because the methods exist to do them), and the excessive application of Thurber's Rule — "don't get it right, just get it written"[14]. Only by inferring these causes can we account for the occurrence of "yes and no" statements in patients'charts such as: "Not suicidal but may harm self if left unattended"; or the publication in major journals of articles that tell us the human breast swells and shrinks periodically during the menstrual cycle[14]; or the appearance of this sentence by Harvey Cushing[15], who was held up by some as a model medical writer[13]: "The persistence of the characteristics of infantilism in a number of our puppies subjected to a partial hypophysectomy, and the occasional evidence of secondary atrophy of the sexual organs, together with the appearance of adiposity in several of the adult animals, suggests that the cases in which an hypophyseal tumor has been found in common with symptoms of adiposity and either a persistence of infantilism or a secondary sexual degeneration, point oward the lowering of hypophyseal activity as the explanation of this

clinical syndrome"[15]. This sentence contains all ten of the "recurring faults" of medical writing identified by Crichton[13]. What is Cushing trying to say? About the only message that comes through is that he got it written but if he got it right the reader cannot tell.

If we analyze medical conversations, for example the talk among doctors exchanged during ward rounds, we find additional dark motives: the need to appear learned, the need to be cryptically brief, the need to hide, the need to relieve one's own distress — by hangman's humor — in the face of catastrophic illnesses and dying patients[12], and the need to seem to belong to the club, that is to the medical cult[16] or priesthood[11]. The purposes of this medical *lingua franca*, called MEDSPEAK, are not to communicate but to manipulate the attending physician, to look smart, to speed up the work of ward rounds and to avoid making definite commitments to a diagnosis or course of therapeutic action[12]. In the talk between patient and doctor, excessive candor on the part of the physicians often causes misunderstandings[17], and social, regional and ethnic gaps between patient and doctor may make communication so difficult that a translator is required[18]. All the causes of medical obscurity listed so far also interfere in a serious way with general communication between the medical profession at large and the public[19].

These causes are reverberative. Some are conscious, like the wish to appear learned[12]. Others are unconscious, like the excessive, indeed the ritualistic use of the word "essentially" which drains the meaning out of any sentence[10,12] and has the purpose, hidden from the user, of absolving him from alliance with any point of view and from the duty to do anything concrete for a patient. By reverberative I mean that bad linguistic habits breed further bad habits[10]. Constant use of poor syntax and all the rest[13] softens the brain of the erring writer and speaker[10]. In George Orwell's words: "if thought corrupts language, language can also corrupt thought"[20], not only in the listener or reader, but in the speaker or writer himself[10]. The use of accepted ready-made idiom, a natural fault because it is the easy thing to do, blunts the thinking process[14]: "unless you make a conscious effort to prevent it, the existing dialect will come rushing in and do the job for you, at the expense of blurring or changing your meaning"[20]. The addiction of medical writers to the use of the passive voice provides a clear example of how meaning can be blurred and obscured so that the writer can present himself as

conventional and therefore safe, formal and therefore respectable, distant and therefore objective, "scientific"[13] and therefore general, all-embracing, cosmic, highly significant[21,22].

Getting used to obscure language not only damages the user but leads to other kinds of imprecision. Orwell came to believe that "the great enemy of clear language is insincerity" (such as Crichton described in medical writing[13]); vague talk and fuzzy writing, he thought, damage political behavior[20]. Max Beerbohm was of the same mind: "Already one discerns a debasement of English; and other debasements will follow that. With the blunting of precision in language ... comes muddiness in political policy, in morality, and in conduct"[23]. (He might have added, "in science and medicine"[10]). The debasement or at least the distortion of conduct by casuistical use of language becomes plain in the case of the official of the American Medical Association who literally equates medical ethics, that is, medically ethical behavior, with fee-for-service private practice[10,19,24]. If you pursue that kind of practice you are ethical; if you do not, but espouse prepaid, government-funded "public" medicine, you are unethical[24].

This recapitulation of medical communication discloses many things. The obscurity is not owing entirely to linguistic incompetence[13,14]. There is plenty of incompetence[4,10,12-14,16-18,21,22] but most of the obscurity is not due to ignorance and ineptitude; it is deliberate[10,12-14]. The obfuscation is done on purpose and should therefore be defined as obscurantist. Medical obscurantism, undesirable as it is, has acquired respectability through its ancient origin; it has been part of clinical medicine since the thirteenth century and probably earlier. An unknown portion of medical obscurity, like every other kind of obscurity, is an inevitable result of the intrinsic deficiencies of language as a vehicle of communication. The relation of thought to language is itself obscure[1,2]; it is certainly complex[3]. Language has many purposes other than communication[25]. Some of the purposes of medical language, and by extension, of other languages, have been touched upon in this essay. Some are conscious: to show off, to conceal ignorance, to display scientific profundity[13], to appear learned, to save time[12], and the wish to seem a member of the closed medical circle[16]. Some are unconscious: the need to hide and to relieve one's own distress by joking[12]. Some are between conscious and unconscious, many of them semi-consciously imitative such as the universal resort to the passive voice[10,21,22].

I have listed a few of the causes. The effects are inadequate and slipshod communication, so that the disease becomes steadily worse[10,20]. It is obvious these sequelae have a common property, one that is exclusionist: it shuts out the outsider. The medical obscurantist builds his esoteric community with the same *hubris* as the Babylonian tower-builders of Genesis 11: "let us make us a name", let us forge an identity, "lest we be scattered abroad", so that we may remain huddled together safely bound and protected by our common secrets. The thinking is primitive and magical, perhaps atavistic. But the result of medical obscurantism, stemming from multiple causes, intended as well as unwitting, is exclusion and isolation[26].

Maybe we cannot do better. If language is not "designed" primarily or only for communicating[1,25], and if human beings are inherently driven to exclusion and isolation, as was inferred in the phenomenon of "forgetting" the names of new people, the improvements in medical communication one can hope to make are perhaps no more than cosmetic. Unobstructed communication may be more than human beings can tolerate. Some day a "perfect" human language may evolve, one in which the thought and the language, the expression, are one[10]. If that should come about, our capacity to bear communicated thought undisguised and unadorned will have to undergo a parallel improvement, like William Blake's children in *The Little Black Boy*, who must gradually acclimatize themselves to the Divine Presence: "that we may learn to bear the beams of are too intense for us at our present stage of evolution[8]: "... humankind Cannot bear very much reality"[27]. Perhaps mechanisms for limiting the volume and intensity of communication may have evolved in a formal way, and may therefore be supposed to have survival value[3,8]. As for speciation, so it is for the optimal development and thriving of the individual: some critical amount of isolation may be necessary. The writer offers this hypothesis: the inevitable disguise of thought by language[1] is a salutary device for keeping the individual at a distance from others, from "the other", "the stranger". The corollary is that too much proximity is dangerous; linguistic obscurity is a suitable defense against undue proximity, one of many devices that preserve the integrity of the single self.

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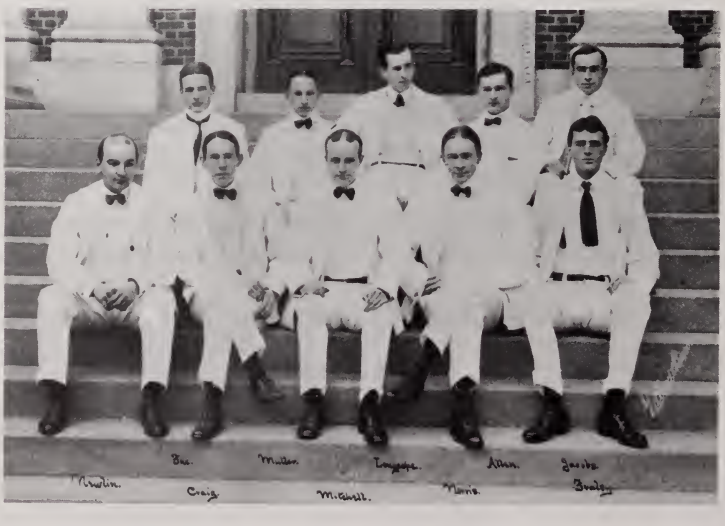
The following captions are printed in correction of those appearing under the same photographs in the September issue of *Transactions & Studies* (Series V, Vol. III, No. 3, pp. 163 and 167):

Photograph of Warfield T. Longcope taken by G.W. Norris during Longcope's tenure as Director of the Ayer Laboratory at the Pennsylvania Hospital.



Photograph of the resident staff of the Pennsylvania Hospital taken in 1900 on the steps of the Administration Building. Dr. Longcope is in the center of the back row.

David L. Drabkin, M.D., 1899-1980
A Personal Memoir

JULIAN B. MARSH

MY first recollection of David Drabkin stems from a strange encounter in his home at 2404 Pine Street, Philadelphia (where he lived for more than 50 years) which was engineered by my mother. I was a high school senior in New York City, the year was 1940, and the interview was arranged because I had applied for admission to the College of the University of Pennsylvania in a determined effort to escape from home. My parents, naturally, wished to be spared the expense consequent upon my leaving New York, and as an only child, I think they were also reluctant to loosen the parental ties. Philadelphia seemed to me a good choice since it was large, like New York, and only 90 miles away. David Drabkin was a member of the medical school faculty and an old friend of my mother's, since he was a City College chum of my uncle, her younger brother. I had heard many stories about David and my uncle Phil's exploits on the public tennis courts of New York and elsewhere in their college days. According to my mother, whose views were decidedly Victorian, Dave Drabkin was always "wild" in his youth. I still have, somewhere gathering cellar dust, a photo of David at about that time, with a full head of hair. He was practically bald his entire adult life, and few who saw that picture when David retired as a department chairman recognized him at first. Also, the picture did not show him puffing on his pipe, which never left his mouth or hand until one day, late in life, when he was concerned about a lesion on his palate, he suddenly quit smoking, to the amazement of us all.

To return to that first encounter, as a frightened interviewee anxious to get into Penn, I remember little of David Drabkin, being far more impressed with his attractive wife Stella, who was trying to put me at ease as David did all the talking, as usual. The upshot of the conversation was that my mother was convinced by David that Penn was a good school, that Philadelphia was not too far from New York, and that as a CCNY graduate himself, he was sure it would be easier for me to ultimately gain admittance to the medical school (which was, of course, my mother's real goal, unknown to me at that time in my innocence of worldly affairs). I believe he also said something about surrogate parentage to reassure my mother. That

would have been a role he would have enjoyed, since he and Stella had no children. David missed this a great deal, and part of his effectiveness as a teacher was related to a sublimated parental drive. He had no chance to exercise this on me while I was in college — I did go to Penn — because I never saw him. I did my best to avoid elderly friends of my parents at that time.

David went to Cornell medical school, graduating in 1924, parting company with my uncle Phil Bunsick who went to NYU and became a general surgeon in Brooklyn. I have not seen David's academic record, but my uncle told me that both his college and medical school grades were close to perfection. David's sister and younger brother were also achievers, but in the legal profession. In particular, he was proud of his sister Zenaida's accomplishments, and one must remember how rare it was for women to achieve professional status sixty years ago. Though he spoke often of his experiences as a medical student, and though his research interests were always broadly related to medicine, David was more interested in research and he became a National Research Council Fellow at Yale from 1924 to 1926. There, he was influenced by nutritionists Graham Lusk and G.R. Cowgill. His earliest work was on insulin, a hot subject in the mid-1920s, and his first published paper was entitled "Blood Concentration in Insulin Hypoglycemia," which was published in the *Proc. Soc. Exp. Biol. Med.* 21 (1924): 309-11. His coauthors were Irvine H. Page and D.J. Edwards. The full description of this work appeared in the *Am. J. Physiol.* 70 (1924): 273-82, with D.J. Edwards as coauthor. In 1926, David married Stella Friedman of New York and they moved to Philadelphia, where he took a position of Instructor in Biochemistry (then called Physiological Chemistry) in D. Wright Wilson's department at Penn. To summarize his academic career quickly, he became an Assistant Professor in 1929 and an Associate Professor in 1940. In that year, he took his only sabbatical leave, as a Guggenheim Fellow at Johns Hopkins. He returned to Penn and in 1946, instead of accepting a full professorship in Wilson's department, he was named chairman of a new Department of Biochemistry in the Graduate School of Medicine, which in the early postwar period was the forerunner, along with the Columbia postgraduate school, of postgraduate medical education in this country. At this time, the rebirth of the Graduate School of Medicine, which had been in existence since 1919, was due in no small part to the establishment, in addition to

Biochemistry, of independent science departments under the leadership of William Ehrich (Pathology), Julius Comroe (Physiology), Seymour Kety (Pharmacology), and Oscar Batson (Anatomy). I also remember John Flick lecturing in Microbiology. The clinical departments, which had their base at the Graduate Hospital downtown at 19th and Lombard, boasted many leaders such as Henry Bockus (Gastroenterology) and L.K. Ferguson (Surgery). Dr. I.S. Ravdin played an important role in the growth of the Graduate School of Medicine in these postwar years and was a research collaborator and staunch supporter of David Drabkin. By 1965, however, it was clear that Penn no longer wished to maintain two medical schools and two hospitals. The rise of residency training programs, directly competing with the Graduate School for students, combined with some rivalry between the Medical School and Graduate School departments, contributed to the demise of the Graduate School. Thus, David Drabkin was the first and only chairman of his department. I became chairman of a new department of Biochemistry in the School of Dental Medicine in 1965 and I persuaded David to join me upon his retirement in 1968, which he did. Thus, he was Emeritus Professor in the School of Dental Medicine from 1968 until his death.

David Drabkin's research career centered upon the study of chromoproteins by optical methods. It began with a study of urochrome, the compound responsible for the characteristic color of urine. He published four papers on this subject in 1927 and two in 1930, and it led him to his lifelong study of another chromoprotein, hemoglobin. One of the oddities of history is that urochrome has been completely neglected for 50 years, and its precise structure is still unknown. Interestingly enough, David's work on hemoglobin began with the nutritional approach in which he had been trained at Yale. He was very much concerned with the fact that some 14% of daily nitrogen balance was due to hemoglobin turnover and with the fact that anemia was a common finding in protein undernutrition. In the course of his work, he found that amino acid administration corrected the anemia produced by certain milk diets and this work laid the foundation for his collaborative work with Dr. Ravdin and still later, with Dr. Jonathan Rhoads, when problems related to intravenous feeding of surgical patients arose. No papers with David as collaborator were published, but I distinctly remember Dr. Rhoads' discussions with him when the question of an appropriate

intravenous formula was raised in conjunction with the very exciting work of Dr. Dudrick and Dr. Rhoads on intravenous hyperalimentation.

To return to the 1930s, it was at that time that David began his monumental work on the spectrophotometric constants of hemoglobin derivatives. Paper I in this series, with Dr. J. Harold Austin, was published in 1932 and was entitled "Spectrophotometric Constants for Common Hemoglobin Derivatives in Human, Dog, and Rabbit Blood"; the last paper in the series, no. XVI, published twenty-five years later in 1957, was entitled "Determination of Oxygen Saturation of Blood by a Simplified Technique" with E. Gordy and J.B. Marsh. The 1932 paper was truly a landmark in spectrophotometry, and established the use of cyanmethemoglobin as a hemoglobin standard. In 1945, after his pioneer work on the crystallization of human hemoglobin, David was a leading protagonist in an international group which established his method as the standard for hemoglobin measurement, used now throughout the world. Some manufacturers sold a reagent kit containing the cyanide and ferricyanide needed to convert hemoglobin to the cyanmet derivative, and called it "Drabkin's solution", but he was never consulted about this and always disliked it. I suppose he could have sought some sort of financial benefit from the commercial use of his name but he never did. I suspect he liked the publicity and disliked the legal process.

My second contact with David occurred after I had been admitted to the University of Pennsylvania School of Medicine in 1944. I am reasonably sure he wrote a letter of recommendation for me, probably at my mother's request, to Dr. Elizabeth Ravdin who was in charge of admissions during the war. I had been a chemistry major but was not sufficiently interested in organic chemistry to make that my career, and I was easily persuaded to study medicine, particularly since this promised to delay my entry into overseas service in the army for about three years. It did; World War II was over when I graduated in 1947. In the late spring of 1944, after a disastrous semester trying to cope with Anatomy, I discovered Biochemistry, a field I had not known existed. Dave Drabkin, then Associate Professor in Dr. Wilson's department, was one of my professors; because of my earlier contacts, I felt I could approach him about doing some research in my spare time! The exclamation point relates to the fact that, in uniform and in medical school in 1944, I

had the delusion that I had spare time. I well remember David's response. He outlined a problem for me and then left me alone. I remember coming to him completely puzzled about the operation of the Evelyn colorimeters which were not as simple as the Klett-Summerson instrument with which I was familiar. David regarded himself as my collaborator, not the other way around, and I soon found myself doing all sorts of crazy experiments which I'm sure he knew would fail. Finally, he thought that I should receive training in the Warburg manometric technique with which he was not familiar, in the laboratory of Dr. William C. Stadie, Professor of Research Medicine, and it was there that I continued my work just prior to graduation. In the interim, in David's laboratory, I had begun work with a classmate, Bill Goddard, on a theory of glucose reabsorption by the renal tubules. This work had its origin in David's interest in the action of insulin, one of his earliest interests, which was accentuated by the fact that at around this time, he fell victim to a sudden onset of severe, insulin-dependent diabetes, a disease requiring lifelong attention to diet and insulin. David was probably as well-controlled a diabetic as it was possible to be, and the fact that complications of this disease caught up with him only in his eightieth year is to my mind a significant argument for close control of blood glucose levels in insulin-dependent diabetes.

Dave Drabkin was very much a lone investigator but he was also a strong collaborator. He began to branch out in the 1940s to the study of other chromoproteins; when I joined his department in 1952 we began a study of the biosynthesis of cytochrome *c*. Two years later, we embarked on a study of experimental nephrosis in rats, stimulated by his colleague Dr. William Ehrich, who had carried out an interesting study of the pathology. All his life, David insisted that "Disease is the great teacher", and that animal models of human disease were essential to the understanding of normal metabolic pathways.

David Drabkin's expertise in optical methodology was widely recognized. He was the author of this section in Glasser's *Medical Physics* and was a pioneer in the measurement of the oxygen saturation of whole blood by optical methods. In the late 1930s and early 1940s he constructed his own ultraviolet spectrophotometer, which I remember as an enormous instrument which took up an entire room in the Biochemistry department at Penn and seemed to be forever down for repairs. Before it became obsolete by the

commercial development of the Beckman DU instrument, it was used for only one study that I know of — but this was an important one — by Otto Meyerhof, who had fled to Philadelphia from Germany in the wake of Nazi persecution at the start of World War II. Meyerhof measured the equilibrium constant of the glyceraldehyde dehydrogenase reaction using David's new ultraviolet spectrophotometer.

A picture of Dave Drabkin in the mid-1940s, at the peak of his career, might look something like this. He was a bald, pipe-smoking, energetic lecturer with a great knowledge of and enthusiasm for his subject, hating to correct exam papers, and always buttonholing his colleagues in the halls — you couldn't escape him — to tell the latest off-color joke he had just heard, usually from artist friends of his wife. The medical students, knowing of this, often referred to him as Dirty Dave.

Perhaps because of his isolated position in the Graduate School and because of his strong personality, he did not have a large number of graduate students, but he did collaborate with quite a few people. The ones I remember include Richard B. Singer, of whom he was very fond, George A. Braun, sponsored by both of us, and J.D. Hardy, a surgeon interested in measuring body water. His early collaborators included J. Harold Austin, Otto Rosenthal, Carl Schmidt, and Ashton Graybiel, as well as Paul Nemir in surgery. Among his post-doctorals, I particularly remember Makio Murayama, who was interested in sickle cell hemoglobin and who did not get along with David at all. It was absolutely typical of David that he made a greater effort to find a good post for Dr. Murayama at NIH than he did for anyone else. He always leaned over backwards to be fair.

A trip to Germany in the early 1930s led David to collect memorabilia for his lifelong interest in the life of J.W.L. Thudichum, a German chemist and physician who worked in England and who was the greatest early investigator in neurochemistry, discovering cephalins and sphingomyelin in addition to inventing the nasal speculum for clinical use. David finally published his biography of Thudichum in 1958. The book reveals as much about David Drabkin as it does of his subject. In many ways, David resembled his hero since both were "Renaissance men" with interests in medicine, music, art and chemistry. David was an expert photographer and enlarged photographs of his human hemoglobin crystals were exhibited at the Philadelphia Art Alliance. David was a creative

artist himself, though not in the area of painting. He was a skilled calligrapher and drew all his own diagrams for his papers. After his wife Stella's death in 1971, he put many of his photographs together, after he had retired at age 76 in 1975, and published a book called *Fundamental Structure — Nature's Architecture* with a text accompanying some 50 photographs. David's devotion to Stella was of such intensity that he became a walking skeleton during her terminal illness in 1971 and his own decline was obvious to everyone from that time on.

David was of course a member of many scientific and learned societies. Perhaps he was most fond of his membership in the Sydenham Coterie of Philadelphia, a small group of outstanding clinicians and medical scientists which met at one another's homes periodically to read papers and to discuss medical and scientific subjects. I have always been amazed at the paucity of the usual worldly honors that came his way during his lifetime. I think there are several reasons for this; perhaps the most important one was that his work was so early that it tended to be forgotten during the postwar era when the numbers of scientists increased exponentially. Since he was never the head of a large department and had few students, there was no large number of well-known people to sing his praises. For example, David was never elected to the National Academy even though his achievements clearly made this an obvious honor. David never sought honors, and I don't think this bothered him in his prime, but in later years I think it did, even though he never mentioned the subject. As so often happened in his career, the old National Academy was reformed, so that now it is not entirely a collection of old men elected by their cronies, but of course this change came too late for David.

David was a gifted teacher, and the medical, dental, and post-graduate students he taught are scattered all over the world. I have no doubt he will be remembered fondly by all of them. I have heard him lecture at least one hundred times, and not once did he give less than one hundred per cent of himself. To the best of my knowledge, he was never late nor did he ever miss a lecture for any reason in the fifty-five years or so he taught. He was immensely proud of the achievements of his wife Stella and of his nephew, Dr. Gregory Siskind, now Professor of Medicine at his alma mater, Cornell. David Lion Drabkin was an unforgettable character, and his career is a rich chapter in its own right in the history of American Medicine and Biochemistry.

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